

CAI
BS 1
1993
R 60

Analytical Studies Branch



Years of *Ans*
Excellence *d'excellence*

3 1761 118922517

WHAT IS HAPPENING TO EARNINGS INEQUALITY IN CANADA?

by

R. Morissette, J. Myles* and G. Picot

No. 60

Research Paper Series



Statistics
Canada

Statistique
Canada

Canada



ANALYTICAL STUDIES BRANCH RESEARCH PAPER SERIES

The Analytical Studies Branch Research Paper Series provides for the circulation, on a pre-publication basis, of research conducted by Branch staff, visiting Fellows and academic associates. The Research Paper Series is intended to stimulate discussion on a variety of topics including labour, business firm dynamics, pensions, agriculture, mortality, language, immigration, statistical computing and simulation. Readers of the series are encouraged to contact the authors with comments, criticisms and suggestions. A list of titles appears inside the back cover of this paper.

Papers in the series are distributed to Statistics Canada Regional Offices, provincial statistical focal points, research institutes, and specialty libraries. Each paper is catalogued on the DOBIS computer reference system and in various Canadian university library reference systems.

To obtain a collection of abstracts of the papers in the series and/or copies of individual papers (in French or English), please contact:

Publications Review Committee
Analytical Studies Branch, Statistics Canada
24th Floor, R.H. Coats Building
Ottawa, Ontario, K1A 0T6
(613) 951-8213

**WHAT IS HAPPENING TO EARNINGS INEQUALITY
IN CANADA?**

by

R. Morissette, J. Myles* and G. Picot

No. 60

Business and Labour Market Analysis Group
Analytical Studies Branch
Statistics Canada
1993

* Department of Sociology and Pepper Institute on Aging and Public Policy, Florida State University

Special thanks to Tarek Harchaoui and Debby Tobolt for excellent research assistance.

The analysis presented in this paper is the responsibility of the authors and does not necessarily represent the views or policies of Statistics Canada.



Digitized by the Internet Archive
in 2024 with funding from
University of Toronto

<https://archive.org/details/31761118922517>

**What is Happening to Earnings Inequality
in Canada ?**

by

René Morissette

John Myles *

Garnett Picot

Business and Labour Market Analysis Group
Statistics Canada

December 1993

* Department of Sociology and Pepper Institute on Aging and Public Policy, Florida State University.

Special thanks to Tarek Harchaoui and Debbie Tobolt for excellent research assistance.

ABSTRACT

Data from the Survey of Consumer Finances covering the period 1969-1991 show that inequality in annual earnings increased in Canada during the 1980s. The rise in inequality is not solely due to the 1981-83 recession. Shifts in the composition of employment away from manufacturing and towards the service sector do not explain much of the observed rise in inequality. The growth in earnings inequality resulted partly from an increase in earnings differentials among age groups. Earnings differentials among education levels did not widen substantially. Most of the increase in earnings inequality occurred within groups of comparable workers, i.e. within groups of similar age and education.

Data from the Survey of Work History of 1981 and from the Labour Market Activity Survey of 1989 show that unlike the United States, where changes in earnings inequality have resulted mainly from changes in the distribution of hourly wages, the increase in Canadian earnings inequality is, at the aggregate level, mainly driven by changes in the distribution of annual hours worked. Changes in inequality in hourly wages are not substantial at the aggregate level. The small change in inequality in hourly wages at the aggregate level masks off-setting trends which are substantial. These trends consist of : 1) an increase in the wage gap between young and older workers, which tends to increase hourly wage inequality, and 2) decreases in hourly wage inequality resulting both from changes in the composition of employment and from decreases in hourly wage dispersion within age groups. These findings imply that - apart from cyclical factors - changes in the distribution of annual hours worked and changes in hourly wages among age groups are the main forces which increased earnings inequality in Canada during the 1980s.

Introduction

A general rise in inequality driven by greater inequality in wages and earnings emerged as a generic feature of many Western countries during the 1980s (Davis [1992]; Danziger and Gottschalk [1993], OECD [1993]). To date rising earnings inequality in Canada has stimulated comparatively little sustained attention. As a result, our understanding of this development has been shaped by the now enormous empirical literature that has emerged in the United States (see Levy and Murnane [1992]) and the various interpretive analyses that have emerged to "make sense" of these facts (e.g. Bluestone and Harrison [1986] ; Reich [1991] ; Katz and Murphy [1992]).

One reason for the paucity of Canadian work in this area is no doubt the fact that rising inequality in **labour market incomes** has so far been offset by **social transfers** so that, unlike the U.S., the final distribution of **total family incomes** in Canada has been relatively stable during the 80s (Wolfson [1992]; Blank and Hanratty [1991]; Economic Council of Canada [1991]; Hanratty and Blank [1992]; Love and Poulin [1991]). Clearly, however, a secular rise in the demand for transfers created by market-driven changes in the distribution of wages and earnings poses an unwelcome and untimely challenge for public policy-makers in an era of high government debt and slow economic growth. Rising inequality in the labour market means more work for the welfare state or, alternatively, rising poverty and a decline in aggregate social welfare.

A second reason for the scarcity of Canadian studies of labour market inequality may reflect an element of the free-rider problem. Canadian and U.S. labour markets often move in tandem as a result of the high level of economic integration between the two countries. If it can be assumed that the rise in earnings inequality in the two countries are the result of similar economic forces, then American analyses can be imported to Canada with only minor modifications. One goal of this paper is to establish whether this is so.

In section one, we begin by establishing the facts of the matter. Previous studies (Leckie [1988]; Myles, Picot and Wannell [1988]) have documented the rise in inequality and polarization that took place during the recession and subsequent recovery that occurred between 1981 and 1986. But whether this shift was simply a cyclical phenomenon induced by the recession of the early 1980s remains largely undocumented. To our knowledge, only Wolfson [1992] and Beach and Slotsve [1993] have addressed this issue so far. Their results indicate that the increase in inequality and polarization of earnings which

was observed between 1981 and 1986 is not merely a cyclical phenomenon. However, these findings are either based on a fairly small number of observations (6 years covering the period 1967-1990 in Wolfson [1992]) or on interpolation procedures (i.e not on actual micro data sets in Beach and Slotsve [1993]). We extend the work of these authors by using micro data sets (from the Survey of Consumer Finances) for thirteen years covering the period 1969-1991. Our results confirm that the rise in inequality and polarization observed in the 1980s is not solely due to the 1981-83 recession.

In section two, we document the rise in earnings inequality in more detail. We highlight four points. First, as shown by Myles, Picot and Wannell [1988] and OECD [1993], shifts in the composition of employment away from manufacturing and towards the service sector do not explain much of the observed rise in earnings inequality and polarization. Second, the growth in earnings inequality resulted partly from an increase in earnings differentials among age groups. This occurred as real earnings of workers aged less than 35 fell dramatically between 1981 and 1986 and never returned to their 1981 level afterwards. Third, in contrast to what is observed in the United States, earnings differentials among education levels did not widen substantially. Fourth, for all male earners as well as for both male and female full year full-time workers, most of the increase in earnings inequality occurs **within** groups of comparable workers, i.e. within groups defined jointly by age and education. This suggests either that skills uncorrelated with age and education are important determinants of workers' increasing dispersion of earnings or that other factors, not related to workers' attributes, but rather related to the firm or the industry in which individuals are employed, underlie a significant portion of the rise in earnings inequality.

The decline in earnings of young workers is not unique to Canada. One interpretation (e.g. Mincer [1991], Bound and Johnson [1992], Davis [1992]) suggests that the widening of the age-earnings differential may be due to some technological change that would increase the relative demand for experience based skills and thus for older workers. We argue that other stories, including some based on a theory of internal labour markets or on some form of **de-skilling**, are also consistent with the data.

The focus in the first two sections is on inequality and polarization of annual earnings. Yet, changes in the distribution of **annual** earnings may result either from changes in the distribution of hourly wages rates or from changes in the distribution of annual hours worked. The rise in part-time and temporary employment, for example, could by itself alter the distribution of annual earnings. The Survey of Work History (1981) and the Labour Market Activity Survey (1986 to 1990) are the only data sets

which can be used to address this issue in Canada. However, the way annual hours are calculated differs between the two surveys. As will be explained below, this creates data consistency problems for the subset of individuals holding jobs part of the year. In section 3, we overcome these problems and show that unlike the United States, where changes in earnings inequality have been largely a result of changes in the distribution of hourly wages, shifts in Canadian earnings inequality are, at the aggregate level, mainly driven by changes in the distribution of annual hours worked. Changes in inequality in hourly wages are not substantial at the aggregate level. Yet, this does not mean that little action is taking place in the distribution of hourly wages. The small change in inequality in hourly wages at the aggregate level masks off-setting trends that are substantial. These trends consist of : 1) an increase in the wage gap between young and older workers, which tends to increase hourly wage inequality, and 2) decreases in hourly wage inequality resulting both from changes in the composition of employment and from decreases in hourly wage dispersion **within** age groups. These findings imply that - apart from cyclical factors - changes in the distribution of annual hours worked and changes in hourly wages among age groups are the main forces which increased earnings inequality in the 1980s. Having established that, we show that the changes in the distribution of annual hours are observed for individuals holding full-time jobs and thus, cannot be explained solely by the rise of part-time employment. We then offer various explanations for the changes observed in the distribution of working time. In our conclusion we discuss alternative strategies to guide future analysis.

1. From the Seventies to the Nineties : Earnings Inequality and Polarization in Canada

The charts in Figure 1 show trends in earnings inequality from 1969 through 1991 for four populations and with four different measures of inequality¹. Each of the measures is sensitive to somewhat different shifts in the shape of the earnings distribution. The Gini coefficient (GINI) is sensitive to changes in the middle of the distribution, the coefficient of variation (CV) to movements at the top, and the Theil-

¹ The sample selected in the first two sections of the paper consists of individuals aged 17 to 64, with positive wages and salaries and with no income from self-employment during the reference year. Similar to Wolfson (1986, 1992), we also require that the annual earnings of these individuals be greater than 2.5 % of sex-specific mean annual earnings. The four populations studied are : 1) all male earners, 2) full year full-time male workers, 3) all female earners and 4) full year full-time female workers. Full year full-time workers are defined as individuals working at least 48 weeks per year and working mainly full-time during those weeks. Over the period 1969-1991, the percentage of earners working full year full-time varies between 66 % and 74 % for men and between 46 % and 57 % for women. The years selected in this paper are 1969, 1971, 1973, 1975, 1977, 1979, 1981, 1983, 1986, 1988, 1989, 1990 and 1991. The data are taken from the Survey of Consumer Finances and are not top-coded.

Entropy (TE) and Theil-Bernouilli (TB) indices to movements at the lower end of the distribution².

Among **all male earners**, inequality was relatively stable during the 1970s and began to rise with the onset of recession in 1981, peaking in 1983. As the recovery of the 1980s continued, inequality began to moderate until the end of the decade when, with the onset of recession, it moved upward again. At no point did male earnings inequality return to 1970 levels. Among **men employed full-time and full year**, earnings inequality exhibits a U-shape³. After decreasing somewhat at the end of the seventies, it rose during the 1981-83 recession and then remained fairly constant for the rest of the decade. Inequality also increased in the eighties for **women employed full-time and full year**. It then declined somewhat as the decade came to an end⁴. Among **all female earners**, including those employed part time and/or part year inequality moved upward during the recession of 1981-83 and then declined. This occurred because part-time/part-year women began to work more hours and, as a result, their annual earnings rose relative to women employed full-time and full year. Yet, for all three other groups, inequality rose during the 1981-83 recession and never returned to its 1981 level afterwards⁵. More precisely, inequality was higher in 1989 than in 1981, two years during which the unemployment rate stood at 7.5 %. Hence, while part of the increase in earnings inequality observed in the 1980s is admittedly driven by cyclical factors, some fraction of it appears to be rooted in changes of a more permanent nature that affect the labour market.

² The Gini coefficient (GINI) = $\sum W_i (y_i / \mu)$, where $W_i = p_i [\sum_{j=1}^J 2p_j - p_i - 1]$; the coefficient of variation (CV) = $\{[\sum p_i (y_i - \mu)^2]^{0.5}\} / \mu$; Theil-Entropy (TE) = $\sum p_i (y_i / \mu) \ln(y_i / \mu)$; and Theil-Bernouilli (TB) = $- \sum p_i \ln(y_i / \mu)$, where p_i is the proportion of the population in the i -th earnings group, y_i is the average earnings in that group, and μ are the overall mean earnings. See Appendix A for the actual values of the inequality measures.

³ Looking at the chart for men working full year full-time, one notes that between 1983 and 1986, the coefficient of variation declines while the three other measures of inequality increases. As Karoly [1992] showed, this illustrates the need to use more than one inequality measure to assess whether the distribution of earnings is becoming more unequal.

⁴ The reader may wonder to what extent the increase in inequality observed between 1975 and 1977 for women working full year full-time is real. Examination of the data shows substantial and unexpected decreases in the annual earnings at the lowest deciles in 1977. For that reason, we suspect that the observed rise in inequality between 1975 and 1977 is more spurious than real.

⁵ Binder and Kovacevic [1993] show, using SCF file on disposable income for Ontario (sample containing approximately 7,500 observations), that standard errors for the Gini coefficient roughly equal 0.005. This implies - as in Karoly [1992] - that while most year-to-year changes in inequality are not statistically significant, changes over longer periods cannot be attributed to sampling variability.

The previous statistics indicate whether inequality has fallen or risen but do not tell us where in the distribution these shifts have occurred. A rise in inequality may occur because the "rich have gotten richer", the "poor have gotten poorer" or some combination of the two. To establish where the changes have occurred, the charts in Figure 2 show changes in real average earnings for the top, middle and bottom quintiles. The results tell an interesting tale.

For men, the main story is one of declining real earnings among workers in the bottom quintile. This downward drift in real earnings at the bottom of the distribution began not in the eighties but in the middle of the seventies. Until the early eighties, however, the effect of this trend on earnings inequality was offset by a compression of the top half of the earnings distribution. This compression occurred as real earnings in the top quintile fell **relative** to those in the middle quintile. As a result, earnings inequality did not rise until the 1980s when real earnings at the top increased relative to those in the middle and real earnings in the bottom quintile continued to drift downward. The real earnings of the bottom quintile recovered somewhat as the decade progressed but never returned to their mid-1970 levels.

For women employed full-time and full year, the trend was similar except that the top half of the distribution did not become more compressed in the 1970s. As a consequence, the shift in inequality (Figure 1) begins to appear sooner among this group than in the male population. Among the whole population of female earners, the effect of the increase in hours worked by part-time/part year women is evident from 1983; the main result is a substantial rise in the real earnings of the bottom quintile that continues until the end of the decade.

The significance of these results lies in two facts. First, the trends underlying the shifts in inequality identified in Figure 1 begin earlier than the aggregate measures suggest. The downward trend in real earnings among those at the bottom that began in the middle of the seventies is concealed until real earnings among high-income earners begin to rise toward the end of the decade. Second, while cyclical effects are still evident in these results, the underlying secular trend of declining real earnings for those at the bottom and rising real earnings for those at the top are much more apparent.

Between 1973 and 1989, for example, real earnings of men in the middle quintile grew by a modest 1.4 % (Table 1). But the earnings of men in the bottom quintile declined by 16.3 % while men

in the upper quintile saw their earnings rise by 7.9 %. The pattern among men employed full-time full year is less dramatic but the results are similar with the largest impact being felt by men in the bottom quintile whose earnings declined by 7 % compared to a rise of roughly 7 % and 9 % in the middle and top quintiles respectively.

The disparity among full-time, full year women is if anything even larger than among men. Real earnings rose by 18 % in the middle quintile and 26 % in the top quintile but fell by 3 % in the bottom quintile. Again, as can be seen by looking at figures for all female earners, rising hours among part-time and part year women offset the general pattern.

Finally, we show the consequences of these changes for the question that became the focus of the great "inequality" debate of the 1980s -- Is the great North American "middle class" declining (Kuttner [1983]) ? The motivation for this debate was as much social and political as it was economic. Throughout the postwar decades, the emergence of a high wage (predominantly male) working class of semi-skilled but well paid industrial workers was widely viewed as providing the material conditions for social harmony and an indicator of the eroding class divisions that had been the traditional Achilles heel of capitalist economies. Modern capitalism had succeeded where socialism had failed, namely in providing ordinary workers with suburban homes, automobiles and the other accoutrements of a "middle class" life style. Against this historical backdrop, middle class decline was, and is, construed as evidence of a more general social decline and of the end of modern capitalism's "golden age" (Phillips [1993]).

But as pointed out in Myles, Picot, Wannell [1988] and Wolfson [1992], conventional inequality measures of the sort we have considered here are simply not up to the task to answering questions about income polarization (see also OECD [1993]). The Gini coefficient and other inequality measures allow us to answer such timeless questions as whether "the rich are getting richer or the poor getting poorer?". They are inappropriate, however, for establishing whether there are more rich or more poor people than in the past or whether the "middle class" is declining or expanding. To answer the latter sort of question requires polarization measures that describe change in the distribution of individuals across fixed relative earnings levels, a point still poorly understood in the economic literature (see for example, Karoly, 1993:23). As Wolfson [1992] shows, two sets of equalizing transfers, each taking place on one side of the median, may **increase** polarization (or bi-modality) while **decreasing** inequality. Not only is it possible for inequality and polarization measures to move in opposite directions, instances where this occurs are

- as we will show - empirically observed.

To measure polarization (and determine if the "middle" is declining), we proceed in three steps. First, we present trends in three polarization measures (Figure 3). These are defined as the proportion of individuals whose earnings fall in the following intervals : 1) 75 % to 125 % of median earnings, 2) 50 % to 150 % and 3) 25 % to 175 % of median earnings⁶. Second, we show the change in the distribution of earners across median-adjusted earnings levels for the years 1973, 1981 and 1989 for full-time, full year workers (Table 2). The earnings boundaries are selected so that approximately 10 per cent of all earners fall within a given category in the base year (1973). The wages paid in 1973 and 1981 are then inflated to 1989 dollars using change in the median wage as the inflator. This does not account for changes in real wages, but rather allows comparisons of the shape of the earnings distribution to be made and to identify the percentage of earners above or below the same relative earnings at different points in time⁷. Third, using the Gini coefficient and the Foster-Wolfson (1992) polarization measure, we show that inequality and polarization may move in opposite directions.

For both men and women working full-time full year, there was considerable polarization in earnings over the period 1973-1989 (Figure 3 and Table 2). The movement was primarily out of the lower-middle (third to sixth earnings groups) into the very bottom and top of the earnings distribution. Among men there was a net shift of 5.4 percent out of the lower-middle of the distribution. Among women this shift amounted to 7.1 percent. Among men, the size of the lowest earnings level grew from 10.4 to 13.4 percent while the top two earnings level expanded by 1.9 percentage points. Among women, the lowest earnings level grew from 9.8 to 14.9 percent and the highest from 9.9 to 13.0 percent. In short, in 1989 there were more full-time earners at the top and bottom of the earnings distribution than in either 1981 or 1973. When part-time, part-year workers are included (Figure 2 and Table 3), the changes are more pronounced for men and, among women, there is no evidence of polarization whatsoever.

A close examination of Figure 4 reveals that the distinction between inequality and polarization is important empirically, i.e. that inequality and polarization may indeed move in opposite directions. For

⁶ See Appendix B for the actual values of these polarization measures.

⁷ For a full discussion of this methodology see Myles, Picot and Wannell [1988]. This method is conceptually identical to the fixed ratio method used in other studies of the "declining middle class" (see Economic Council of Canada [1991]; Harrison and Bluestone [1988]).

instance, between 1971 and 1979, inequality - as measured by the Gini coefficient - declines for full year full-time male workers while polarization - as measured by the Foster-Wolfson (1992) polarization measure⁸ - increases. In contrast, the rise in earnings inequality observed in the 1980s occurred in conjunction with an increase in earnings polarization.

Together, these results show rising inequality among Canadian men during the 1980s and among women employed full-time full year. This increase in earnings inequality is associated with a decrease in the real earnings of workers at the bottom quintile and with a marked decline in the number of individuals earning "middle class" wages and salaries. What accounts for this development and what have been its consequences ?

2. In Search of Explanation

The early years of the debate over growing earnings inequality and polarization were motivated by several theories that have since been discarded. The first of these attempted to provide a coherent account of the changes in terms of deindustrialization, the claim that international competition was driving high wage manufacturing jobs offshore, leaving behind a service sector polarized among a set of high wage "knowledge" jobs on the one hand and low wage personal service jobs on the other (Bluestone and Harrison [1982]). The second attributed growing inequality to the effects of the "baby boom" and its aftermath : a surge of young workers entering the labour market in the 1970s were now blocking up the labour market driving down wages not only for themselves but also for the cohorts immediately following them. The results soon undermined both accounts.

Most of the change in earnings and wages has been taking place **within** industries, i.e. not as a result of shifts of employment between industries. Both Canadian (Myles, Picot and Wannell [1988]) and American (Blackburn, Bloom and Freeman [1990]) studies have reported that, while substantial, the shift in employment between industries and occupations can account for no more than 17-24 % of the observed change. Gottschalk and Joyce [1992] and OECD [1993] come to similar conclusions for a broader range

⁸ The Foster-Wolfson (1992) polarization measure equals : $2 * [2 * (0.50 - Share50) - Gini] * (\text{Mean}/\text{Median})$, where Share50 is the share of earnings of the bottom half of the distribution and other variables are self-explanatory. This measure increases as polarization increases.

of countries⁹.

As we show below, the declining earnings of younger workers is the most robust finding in the literature (Davis [1992]). However, this downward trend has continued well beyond a period when it could be attributed to the baby boom or its "aftershock" (Betcherman and Morissette [1993]). From an accounting perspective, as we will demonstrate, demographic trends ought to have reduced rather than raised inequality during the 1980s.

More recently, attention has turned to an account that appears more consistent with the data. In this account, the fact of growing inequality among age cohorts is put together with an observed shift in educational differentials to make the case that the key to rising inequality is to be found in rising demand for skilled workers and falling demand for the less skilled. Together, education and work experience (proxied by age) represent the traditional human capital or "skill" measures familiar to most labour economists. Such an account is comforting to the extent that it can be readily absorbed within mainstream economic theory and examined within the confines of the available data sets.

In Table 4 we show that changes in relative earnings between age and education groups, while accounting for some of the change observed in the 1980s, are not the main source of the increase in earnings inequality. To show this we divide the labour force into 25 age/education groups (5 age groups x 5 education groups¹⁰) and decompose change in earnings inequality into three main components : 1) changes in inequality **between** age/education groups; 2) changes in **within** group inequality; 3) and change that results from the changing age/education **composition** of the labour force¹¹. We choose 1981 and

⁹ Note that Myles, Picot and Wannell [1988] look at the effect of shifts of employment between industries on polarization of earnings while Gottschalk and Joyce [1992] and OECD [1993] address this issue in terms of inequality of earnings.

¹⁰ The age groups are the following : 17-24, 25-34, 35-44, 45-54 and 55-64. The education categories are the following : 1) none or elementary, 2) 9-13 years, 3) some post-secondary, 4) post-secondary certificate or diploma and 5) university degree.

¹¹ Since the square of the coefficient of variation, the Theil-Entropy and the Theil-Bernouilli indices are decomposable - the Gini coefficient is not - the decomposition is done using these three inequality measures. The formulas used for the decomposition are the following. The square of the coefficient of variation (CV^2) = $\sum p_i CV_i^2$; $r_i^2 + \sum p_i (1 - r_i)^2$; Theil-Entropy (TE) = $\sum p_i r_i \ln(r_i) + \sum p_i r_i TE_i$; Theil-Bernouilli (TB) = $\sum p_i TB_i - \sum p_i \ln(r_i)$, where $r_i = \mu_i / \mu$, μ_i are mean earnings of group i, μ are overall mean earnings, p_i is the proportion of individuals in group i, and CV_i^2 , TE_i and TB_i are measures of inequality for group i. The results of Tables 4 and 10 are derived by

1988 for our analysis since the economy was at a similar point in the business cycle in both years and because changes in SCF coding procedures for education after 1988 do not permit comparison with subsequent years¹².

For all male earners as well as for both male and female full year full-time workers (populations for which inequality never returned to its 1981 level after the 1981-83 recession), inequality did increase between age/education groups¹³. However, most of the increase occurred **within** groups of similar age and education. Increases in within group inequality account for at least 83 %, 76 % and 65 % of the increase in earnings inequality observed among **all male earners**, **full year full-time male workers** and **full year full-time female workers**, respectively (Table 4). As pointed out by Levy and Murnane [1992], this suggests that : a) either skills not captured by experience and education play an important role in explaining workers' increasing dispersion of earnings or b) that other factors, not related to workers' attributes, but related to the firm or the industry in which the worker is employed, underlie a significant portion of the rise in earnings inequality.

The results also show that among **all male and female earners**, changes in the age/education composition of the labour force tended to reduce inequality ; had there been no change in inequality between and within age/education groups, inequality in 1988 would have been somewhat lower than in 1981 as a result of fewer young workers and rising educational levels.

In Figures 5 and 6 we unpack the changes between age and education groups into their separate components. Figure 5 shows the change in real average earnings by age for the period 1969-91. The pattern shows that average earnings across age groups generally rose in tandem until the mid-seventies

changing r_i first, then changing group-specific measures of inequality and finally changing p_i . Since these terms do not enter linearly, ordering does matter. We examined other orderings and found that the qualitative conclusions we draw are not affected.

¹² In 1989, additional categories were added which substantially reduced the numbers reporting university graduation. As a result, after 1988, the category reporting a university degree eliminates false positives included in preceding years. This tends to increase mean earnings of university graduates relative to other categories after 1988.

¹³ Among **all male earners**, the fraction of the increase in earnings inequality which is due to an increase in inequality **between** age/education groups equals 24 % with the square of the coefficient of variation, 38 % with the Theil-Entropy index and 56 % with the Theil-Bernouilli index. This highlights the necessity to use more than one inequality measure when attempting to assess the relative importance of increases in **between** group and **within** group inequality.

when they begin to diverge dramatically. The main results of interest are for full-year full-time workers where the effects of changing working patterns are minimized. For men under 35, the downward trend begins in 1977, accelerates during the recession beginning in 1981 and remains relatively flat for the rest of the decade. Among younger women, the decline is less precipitous. Real earnings among 17-24 year old women begin to rise after 1986 without returning to the levels of the mid-seventies.

Changes in educational differentials, measured by the university/high school earnings ratio¹⁴, are decidedly less pronounced. There is a modest rise in the university/high school earnings ratio among men under 35 after 1981 and among women aged 17-24 after 1983 but by 1988 these ratios had returned to or fallen below the levels of the 1970s. The pattern among other age groups is relatively flat except for a rise among older women after 1986.

In Table 5 we summarize the changes for the period between 1981, just before the recession, and 1988 when the recovery was near its peak. Columns 1 and 3 show the percentage change in real earnings for men and women by age and education. Columns 2 and 4 show the adjusted percentage change after accounting for changes in education and age composition (see note, Table 5). The adjusted distributions highlight the very large differentials in age-specific earnings growth for all four populations studied. Adjusted figures for full year full-time workers show that over the 1981-88 period, the real earnings of men 17-24 years of age grew 18 % less than those of men 55-64 years old. Meanwhile, the growth rate of real earnings of women aged 17-24 was 10 % smaller than that of women aged 45-54.

Contrary to Freeman and Needels [1991] and Beach and Slotsve [1993], however, our results indicate that earnings differentials between male university graduates and male with 9-13 years of schooling decline somewhat during this period. The reasons for the differences between studies are largely technical. Freeman and Needels show a modest rise in the education premium for the period up to 1987, prior to the decline we observe in 1988 (Figure 6)¹⁵. Beach and Slotsve also note a rising educational

¹⁴ The category "high school" refers to individuals with 9-13 years of primary and secondary education and no further schooling.

¹⁵ Differences in the concept of earnings used and in the sample selected may also be invoked. Freeman and Needels (1991) analyze weekly earnings of university graduates relative to those of individuals with 11-13 years of schooling while our focus is on annual earnings of university graduates relative to those of individuals with 9-13 years of schooling. Furthermore, their sample consists of heads of household and spouses while our sample consists either of all earners or of full year full-time workers. Our education categories are selected to allow

premium between 1984 and 1991 for full year full-time workers. However, since the definition of the educational categories changed after 1988 (see footnote 12), we are hesitant to draw any conclusions about changing education differentials after that year.

Our main point, however, is that in Canada changes in earnings differentials across education levels play a very modest role in explaining rising earnings inequality. In contrast, changes in the age distribution of earnings have been relatively profound.

On a cross-national basis, the Canadian experience has been more in line with other developed economies than that of the United States. As Davis [1992] reports, during the 1980s educational differentials grew dramatically in the United States but only modestly in Canada, the U.K., Sweden and Australia. In Japan there was no change in the educational differential and, in the Netherlands, it declined substantially. In contrast, every advanced economy except Sweden has exhibited sharply rising age-earnings differentials (Davis, 1992:10). What should we make of these facts ?

Davis [1992:11] concludes that in light of the quite different patterns of relative supply and demand shifts among countries (and regions), "the broad similarities across the advanced economies in the evolution of age differentials are remarkable ... [and] favor a unified interpretation of the observed changes ..." These include some form of common technological change that favours more experienced workers in the advanced economies (e.g. because of the short supply of experience based skills in less developed countries) or a common pattern of industrial restructuring toward industries and occupations that make more intense utilization of skills acquired through work experience (Davis, 1992:12). In short, Davis suggests that because of an experience-based skill deficit, young workers in the advanced economies are the most vulnerable to wage pressures resulting from shifting patterns of international trade and production toward developing economies.

The obvious point, however, is that the standard economic view that the shift in the age-earnings profile is indicative of "increasing returns" to experience (skill) is only one of several plausible alternatives. A theory of internal labour markets, for example, would propose that in the face of downward

comparison of data from the Survey of Consumer Finances to data from the Survey of Work History (1981) and Labour Market Activity Survey of 1988.

wage pressures resulting from globalization, older workers are better able to immunize themselves from growing wage competition as a result of seniority rules, firm-specific training and other "institutional" barriers that favour job incumbents over new labour market entrants.

Wage restructuring across age groups may also represent the effects of firm growth and decline. New and expanding firms tend to employ younger workers. Old and/or declining firms tend to employ older workers. Declining relative earnings among younger workers may therefore be a symptom of an emergent low wage regime that will become a generic feature of the labour market in the future. It is even conceivable that growth in the age-earnings differential is indicative of **de-skilling**: new firms that employ younger workers may be introducing technologies that require less skill and pay lower wages than in the past.

Betcherman and Morissette [1993] find that the decline in earnings of workers aged 17 to 24 occurred in conjunction with a decline in their hourly wage rates. They show that, between 1981 and 1988, hourly wages of young workers holding full-time jobs fell - relative to those of workers aged 25-64 - in all major industrial and occupational groups. This suggests that industrial restructuring towards sectors making intense utilization of older workers cannot fully account for the decline in young workers' earnings. Furthermore, they show that the decrease in young workers' relative wages is still observed after controlling for changes in union status. Once again, this implies that the decline in young workers' unionization rate cannot fully explain why their relative wages fell in the 1980s.

All the theories alluded to above - including the skill-based accounts - imply that the rise in the age/earnings differential is closely linked to changes in employers' behaviour¹⁶. Similarly, the fact that most of the increase in earnings inequality takes place **within** industries and **within** groups of workers of similar age and education suggests, among other things, that structural changes occurring within establishments or between establishments of a given industry, whatever they are, may provide the clue to understanding most of the rise in earnings inequality¹⁷ (Levy and Murnane [1992]). Such changes,

¹⁶ The decline in relative earnings of workers aged 17-24 occurred while their relative importance in the labour force **dropped** (from 26 % to 22 % between 1981 and 1986). Thus, it cannot be explained by an increase in the relative supply of young workers.

¹⁷ Another possibility is that skills uncorrelated with age and education are important determinants of workers' increasing dispersion of earnings.

however, may affect workers' earnings by inducing changes either in hourly wage rates and/or in hours worked. In the next section, we ask whether the rise in earnings inequality is mainly due to changes in the distribution of hourly wages rates or in the distribution of working time.

3. Rising Inequality : Due to Changing Hourly Wage Rates or Hours Worked ?

Most people, when thinking about rising earnings inequality, probably think in terms of changes in hourly wage rates; people working for more or less money. Factors influencing hourly wage rates include the changing industrial structure, globalization, changing technology and trading patterns. All of these can influence the demand for low or high wage workers, and hence earnings inequality. However, if fewer Canadians were working "regular" hours while more were working very few or very long hours, this too could lead to an increase in earnings inequality, even if the types of jobs available have not changed.

Numerous factors can introduce voluntary or involuntary changes in the distribution of hours worked. For example, rising unemployment results in increasingly unstable employment patterns, altering the allocation of annual hours worked among Canadians. So does an increasing tendency towards part-time employment, voluntary or involuntary. The effort by firms to introduce more flexibility into the size of their labour force may lead to contracting out, more temporary employment and other non-standard forms of employment which will result in less full-time full year employment, and more part year or part-time employment. Changes in work incentives associated with welfare and unemployment benefits could also change the labour supply decisions of Canadians, affecting hours worked and earnings. Pressures to produce more with fewer full-time permanent workers might result in more hours of work and higher earnings for some workers.

There are signs that a significant change in the distribution of hours worked has been taking place. Van Cleef [1985] found that while average weekly working hours fell from 39.0 to 37.8 between 1976 and 1984, more Canadians were working both fewer and longer hours. Fewer Canadians were working what is considered a "normal" work week. In a follow-up study Gower [1986] showed that it was among those with higher education, presumably working at relatively high wage rates, that working time was

increasing the most. Picot, Myles and Wannell [1990] observed that between 1981 and 1986, both changes in hourly wage rates and hours worked played an important role in rising earnings **polarization**. MacPhail [1993] found that changes in inequality of annual hours worked were predominant in determining trends in earnings **inequality** during the early 1980s¹⁸ ¹⁹.

3.1 The Data

The shortage of appropriate Canadian data is one reason why the role of hours worked has received little attention in the debate on earnings inequality. The ideal data set would contain both annual and weekly hours worked, hourly wage rates in jobs held, and annual earnings. Two existing data sets do contain such information, the Survey of Work History of 1981, and the Labour Market Activity Survey for the years 1986 to 1990. This allows comparisons through the 1980s.

Unfortunately, the coding of annual hours²⁰ worked differs significantly in the two data sets, rendering comparisons potentially misleading. The difference has to do with the way in which job starts and ends are established. In the Survey of Work History (1981), an individual is assumed to hold a job for the entire month as long as he/she reports **one day** of work during that month²¹. In the Labour Market Activity Surveys of 1986 to 1990, the exact day on which an individual starts and ends a job is captured. As a result, the annual hours reported in the two surveys **for an identical job** may differ by 0 to 240

¹⁸ Macphail [1993] uses the Survey of Work History (1981) and the Labour Market Activity Survey of 1986 and 1989. However, she does not recode Labour Market Activity Survey's data on annual hours to make it comparable with that from Survey of Work History (1981). As we will argue below, this creates data consistency problems for the subset of individuals holding jobs part of a year.

¹⁹ Doiron and Barrett [1992] produce a somewhat different analysis that focuses on the importance of hours worked and hourly wage rates in explaining differences in earnings inequality between men and women. Here too, hours worked played the dominant role. The authors conclude that inequality in hourly wages is similar for men and women, and that the greater earnings inequality experienced by women is almost exclusively due to the fact that women's distribution of hours is more unequal than that of men.

²⁰ Hours worked refer to the number of paid hours **usually** worked by the respondent.

²¹ More precisely, "any month in which the person worked at least 8 hours - the equivalent of about one day - is counted as a month in which some work was done" (Source : Microdata User's Guide, Survey of 1981 Work History, section 10.2).

hours²². This problem applies to jobs which start and/or end during the year, i.e. roughly 50 % of all jobs. Furthermore, it always results in an overestimate of hours worked in the Survey of Work History (1981) relative to the Labour Market Activity Survey (1986-1990).

There exists a set of jobs for which the data are comparable: those held all year. Since these jobs do not start or end in the middle of a month, the hours coding problem does not arise. To overcome the data shortcomings, we take the following approach. First, we conduct an analysis of the sub-population of workers holding the same full-time job all year (section 3.2). We determine whether the increase in earnings inequality observed for that sub-population is due mainly to changes in annual hours worked or to changes in hourly wage rates. We find that most of the rise in earnings inequality is due to changes in hours worked. Second, we show that the small change in inequality in hourly wages observed at the aggregate level masks offsetting trends which are substantial. These trends consist of : 1) an increase in the wage gap between young and older workers, which tends to increase hourly wage inequality, and 2) decreases in hourly wage inequality resulting both from changes in the composition of employment and from decreases in hourly wage inequality **within** age groups. Third, we recode annual hours from the Labour Market Activity Survey of 1989 to make them comparable with those from the Survey of Work History (1981) and we show that the results obtained for the sub-population selected generally apply to the whole workforce (section 3.3). Finally, we offer various explanations for the changes observed in the distribution of working time (section 3.4).

3.2 Workers holding the same full-time job all year

Table 6 presents four different measures of inequality in annual earnings, annual hours²³ and hourly wages for individuals holding the same full-time job all year. This sub-population accounts for

²² The upper bound of 240 hours assumes that a person is working 40 hours per week and started a job at the beginning of the last week of, say, January of year t, (the number of hours worked in January will thus be equal to $160 = 40 \text{ hours} * 4 \text{ weeks}$ in the Survey of Work History of 1981 while it will be equal to 40 in the Labour Market Activity Survey. Thus, the difference in the number of hours worked during that month between the two surveys will be 120 hours.) and ended that job after working the first week of, say, August of year t (in which case, the number of hours worked in August will, once again, be equal to 160 in the Survey of Work History of 1981, compared to 40 in the Labour Market Activity Survey).

²³ Note that because of the way in which the sample has been selected, there can be no variation in weeks worked per year (since everyone has worked 52). Hence, the variation in annual hours is a reflection of variation in hours per week only.

roughly 50 % of all earners²⁴. For both men and women, inequality in hourly wages showed very little change between 1981 and 1989; it varied from -3.0 % to 6.1 %, depending upon the measure used. In contrast, inequality in annual hours worked rose dramatically during that period ; it increased from 17 % to 40 %, depending on the measure selected. The increase in inequality in hours worked was associated with a decline in the proportion of individuals working "regular" full-time hours, i.e. working 35 to 40 hours per week ; that proportion fell by 8 % for men and 6 % for women (Table 7). Meanwhile, more people were working longer hours in 1989 than in 1981.

These findings suggest that the observed increase in earnings inequality results mainly from changes in the distribution of hours worked. However, the growing inequality in hours could either decrease or increase earnings inequality, depending upon whether the increase in hours worked is mainly among low wage workers (which would decrease inequality) or high wage workers (which would increase inequality)²⁵. To assess the impact of changes in hours worked on earnings inequality - as measured by the Gini coefficient - we first ask by how much the Gini would have increased between 1981 and 1989 if the distribution of hours had changed during that period and wage rates had remained fixed at their 1981 levels²⁶. Table 8 shows that, had this been the case, earnings inequality would have risen; the Gini coefficient would have increased from 0.237 to 0.248 for men and from 0.238 to 0.255 for women. This hypothetical value of the Gini coefficient for 1989 is actually higher than its actual value for 1989 because changes in hourly wages tended to **decrease** earnings inequality. To show this, we calculate what the Gini coefficient for annual earnings would have been in 1989 if the distribution of wages had changed during that period and hours worked had remained unchanged at their 1981 levels. Under these conditions, the Gini coefficient would have **decreased** from 0.237 to 0.229 for men and from 0.238 to 0.237 for women.

²⁴ Between 1981 and 1989, men holding the same full-time job all year accounted for 54 % to 59 % of all male earners while women holding the same full-time job all year accounted for 43 % to 44 % of all female earners. Overall, 49 % to 52 % of all earners held a full-time job all year during that period.

²⁵ Changes in the correlation coefficient between annual hours and hourly wages indicate that changes in the distribution of hours increased earnings inequality over the 1981-89 period. The correlation coefficient between hours worked and hourly wage rate rose (became less negative) between 1981 and 1989 by .06 for men and .10 for women. This means that, for the sub-population considered, the tendency for low wage workers to work longer hours decreased, as did the tendency for high wage workers to work shorter hours. This would tend to increase earnings inequality.

²⁶ Workers are placed in 100 centiles. For each centile, we calculate average hourly wages, total hours worked and total earnings. We determine what the Gini coefficient would have been in 1989 had centile-specific total hours been equal to their 1989 values and centile-specific hourly wages remained unchanged at their 1981 levels.

Taken together, these results confirm that the increase in earnings inequality observed for individuals holding the same full-time job all year is due to changes in the distribution of hours worked.

The fact that the inequality measures register little change in the distribution of hourly wages does not necessarily imply that there has been no changes in relative wages across some dimensions. As Table 5 showed, the age-earnings differential increased dramatically in the 1980s. The same pattern is evident in hourly wage rates (Table 9). Between 1981 and 1988, real hourly wages in full-time jobs held by men aged 17-24 fell by 13% while those of men aged 45-54 rose by 14 %²⁷.

Why has the increasing wage gap between young and older workers not led to a substantial increase in hourly wage inequality ? The answer is that the increases in inter-age group inequality were partly offset by decreases in inequality resulting from changes in the age composition of employment (i.e. an older workforce) and from lower inequality within age groups (Table 10). Had the increasing wage gap across age groups not been offset by these trends, hourly wage inequality would have increased between 1981 and 1989 by 10 % for men and 5 % for women.

3.3 Generalizing the Results to All Earners

To check whether these results hold for all earners, we recode annual hours from the Labour Market Activity Survey of 1989 to make them comparable with those from the Survey of Work History (1981); whenever an individual reports one day of work in a given month, he/she is assumed to hold this job for the entire month.

²⁷ Part of this may be due to rising educational levels among older workers. As the well-educated baby boom aged and replaced less educated cohorts, one would expect the wages of older workers to increase relative to the young simply because their educational attainment has risen relative to that of the young. This effect is taken into account in columns 2 and 4 of Table 9. In this case, the educational attainment of age groups is not allowed to change and thus, does not influence relative wages. The standardization is done simply by holding the distribution of workers by education constant through time. This distribution is fixed at the 1981 level within each age group and the average wage rate calculated for this new "hypothetical" population. Under these conditions, real wages in full-time jobs fell 14 % for 17-24 year old males, and rose 9 % for 45-54 year old males between 1981 and 1988.

This increasing wage gap between age groups far outstrips any differences observed among educational groups, as shown in the bottom panel of table 9. Whether we use raw data or standardize for changes in the age composition of different educational groups, there is no dramatic difference in wage growth by educational class. This is unlike the United States, where increasing wage premiums among the more highly educated have been observed throughout the 1980s.

The previous results hold when we consider all earners. First, whether we use data from the Labour Force Survey (Table 11) or from the Survey of Work History (1981) and the Labour Market Activity Survey (1986 and 1989) (Table 12), the polarization in weekly hours worked is evident among all employees. Between 1981 and 1989, the proportion of individuals working 35 to 40 hours per week declined by 11 % for men and by 7 % for women, resulting in more people working both very short and very long hours (Table 12).

Second, when we recode annual hours from the Labour Market Activity Survey of 1989 to make them comparable with those from the Survey of Work History (1981), most of the change in earnings inequality is, once again driven, by changes in the distribution of annual hours worked (Table 13). For men, most of the increase in the Gini coefficient of annual earnings, which rose from 0.346 to 0.359, would have occurred if only the distribution of hours had changed between 1981 and 1989 ; if wage rates had been fixed at their 1981 levels and hours worked had changed, the Gini coefficient would have risen from 0.346 to 0.357. Thus, whether we consider the sub-population of men holding the same full-time job all year or all male earners, the growth in male earnings inequality is mainly due to the increase in inequality in hours worked.

Among **all female earners**, earnings inequality decreases slightly between 1981 and 1989. The whole decline in the Gini coefficient (from 0.412 to 0.400) would have been observed if only the distribution of hours had changed between 1981 and 1989. Thus, contrary to what was observed for the sub-population of women holding the same full-time job all year, changes in the distribution of hours tend to **decrease** earnings inequality among all female earners. This result is not surprising. It is due to the fact that over that period, annual hours worked by women employed part-time grew much faster than those worked by women employed full-time²⁸. As a result, the gap between the earnings of women employed part-time and those of women employed full-time narrowed. This reduced earnings inequality. This result explains why earnings inequality rose in the 1980s for women working full year full-time but not for all female earners (Figure 1).

²⁸ Recoded data from the Labour Market Activity Survey show that between 1981 and 1989, average annual hours worked by women with some part-time employment grew by 29 %, compared to 6 % for women employed full-time only. As a result, the growth rate of annual earnings of women with some part-time employment was 30 % **higher** than that of women employed full-time only. This reduced earnings inequality.

Third, recall that the wage gap between young and older workers has increased dramatically for the whole workforce (Table 9). Yet, as was the case for the sub-population analyzed above, this increase in inter-age group inequality has been masked by changes in the age composition of the workforce.

Thus, both for the sub-population of workers holding the same full-time job all year and for all workers, the following trends are observed. First, the distribution of hours worked per week became more polarized during the 1980s. Second, at the aggregate level, most of the increase in male earnings inequality was driven by changes in the distribution of annual hours. For women, changes in the distribution of annual hours increased earnings inequality among the sub-population of women holding the same full-time job all year and decreased earnings inequality among all female earners. Third, the wage differential between young and older workers increased. The associated increase in inter-age group hourly wage inequality was partly offset by changes in the composition of the workforce and changes in hourly wage inequality within age groups.

3.4 Discussion

In the United States, recent studies have painted a different picture. Burtless [1990] uses a different time period (1975 to 1987) and concludes that the rise in earnings inequality is driven primarily by increasing dispersion in hourly wage rates. His analysis suggests that the increasing variance in hours worked played a relatively minor role²⁹. Moffitt [1990] reaches a similar conclusion.

What factors underlie the substantial increase in inequality in hours worked observed in Canada? First let us concentrate on the changes observed at the bottom end of the distribution of hours. An increase in the proportion of individuals working few hours **per week** can only, by definition, be related to rising part-time employment. This topic has been examined in a number of studies, including that from the Economic Council [1991]. An increase in the proportion of individuals working few hours **per year** (i.e. fewer weeks per year or hours per week) could be related to numerous factors. The secular rise in unemployment might play a role. Alternatively, changes in hiring practices of firms may be considered. The 1980s have witnessed a tendency for firms to increase the flexibility with which they can manage their workforces. This may lead "core" workers to work longer hours and may increase the number of

²⁹ He notes, however, that some estimates are necessary in the data that may result in some of the variance being attributed to hourly wage rates that should be attributed to hours worked.

temporary, part-time or contract workers. The declining employment/population ratio among older workers may also decrease the number of hours they work per year.

Yet the data show little change in the bottom of the distribution of hours. Most of the action appears to be out of the middle into the top. What about the increasing number of Canadians working **longer** hours? The first step in exploring this would be to find out who these workers are - their occupation, industry of employment, age, earnings level, etc. One might hypothesize that pressures placed on firms to produce more with fewer permanent workers are contributing to the polarization observed. Some full-time workers would be working longer hours while more would be working part-year. This is of course all speculation. Detailed answers to these questions will have to await further research.

However, our results make it quite clear that, in contrast to the United States, **quantity (hours worked)** responses have been a major determinant of the growth in earnings inequality observed in the 1980s in Canada. A **price** response (hourly wage rate) was also observed, mainly along the age dimension. Relative and real wages of young workers fell dramatically. Had there been no changes in the age composition of the workforce, this would have increased earnings inequality further.

In the reallocation of earnings taking place, Canadian corporations, workers and institutions may favour changes in hours rather than wage rates more than in the U.S. There may be considerably more inertia built into the wage rate structure in the Canadian labour market. Institutional factors may influence this response as well. Whatever the reason, explanations of the rise in earnings inequality will have to consider factors affecting hours worked as well as those affecting hourly wage rates.

Conclusion

Earnings inequality rose in Canada in the 1980s for men and for women working full-time all year. It increased during the 1981-82 recession and never returned to its 1981 level during the recovery of the 1980s. This suggests that structural changes took place during that period.

Throughout the late 1970s and 1980s, real earnings of workers in the bottom quintile fell substantially. Much of this decline was associated with falling relative and real wages of young workers. Yet earnings inequality rose more **within** groups of comparable age and education than between them. Unlike the United States, there has been no significant rise in the wage premium for the more highly

educated workers in Canada during the 1980s. This may be partly due to the very rapid increase in the supply of university and college graduates, which has been rising at about 6 % per year through the 1980s. As earnings inequality increased, the proportion of individuals earning "middle class" wages and salaries fell.

Any explanation of these trends should focus on the groups most affected. Why did real wages of young workers drop through the late 1970s and around the 1981-82 recession ? Why did they not recover during the economic expansion when the supply of youth labour was falling ? A number of possible explanations have been put forward in the paper, many based on similar trends observed in other industrialized countries. At present, however, there is no consensus regarding the cause(s).

A further question is why earnings inequality rose within groups of comparable age and education. Here too, numerous explanations have been put forth but no definitive answer agreed upon. The phenomenon that has probably received the most attention in the U.S. literature, and for which the clearest explanation has evolved, is the rising earnings premium among highly educated workers. The hypothesis involves both supply and demand factors (Levy and Murnane [1992]) and fits nicely with descriptions of a movement towards a "knowledge" or "skill-based" economy embracing more advanced technologies. But as mentioned earlier, a rising premium for highly educated workers is not observed in Canada, at least during the 1980s. It may be that the phenomenon affecting the earnings of the more highly educated is the same in Canada and in the United States but that the relative supply of the highly educated has matched the rising demand (Freeman and Needels [1991]), resulting in both stable relative earnings and unemployment among the highly educated. Such a conclusion is very tentative and requires confirmation through additional work.

This paper has made it clear that, at the aggregate level, growing polarization in both weekly and annual hours worked accounted for much of the rise in earnings inequality in the 1980s. A "declining middle" in the distribution of hours worked translated in a "declining middle class" in the earnings dimension. This occurred primarily among men, both for all male workers and for the subset of those holding full-time jobs all year. While the increase in part-time employment may have been a contributing factor, it is certainly not dominant. An increase in the proportion of full-time employees working longer hours played a major role. These findings contrast with those reported in the United States where research - at least to date - suggests that changes in hours worked have played only a minor role in the growth

of earnings inequality.

Here again definitive explanations are elusive. The data are consistent with the often discussed tendency for firms to move towards a "core" of full-time workers, many of whom are presumably working longer hours, supplemented with increasing numbers of part-time, part-year or contract workers, who may be working fewer hours per year. This would provide firms with more flexibility to respond to demand fluctuations, as well as the ability to focus training and advancement on the core employees. It may also lead to rising inequality and increasing segmentation in the labour market. This is speculation. Other potential explanations have been advanced in the paper.

What of the future? The data suggest that many of the trends were accentuated around the 1981-82 recession. In response to declining demand and increasing competitive pressures during and immediately following recessions, changes may be introduced in the labour market that become structural (i.e. are not reversed over the business cycle). For instance, there is speculation that changes in working patterns in firms are occurring in response to competitive pressures in the aftermath of the 1990-92 recession. The polarization in hours worked may continue to increase as a result, although we have no evidence on this at present. We will have to await additional data to determine if the trends persist in the 1990s.

However, available data sources may not be capable of providing satisfactory answers. If changing technologies and the associated changing skill mix required are a major part of the story, existing data sources are not up to the task. Similarly, if changing human resource practices of firms underlie some of the increases in within group inequality, available data are inappropriate. A firm or establishment survey focusing on human resource practices and labour demand would be needed, along with accompanying data on wages and other aspects of workers' position in the firm.

References

Beach, C.M. and G.A. Slotsve (1993) 'Polarization of Earnings in the Canadian Labour Market', Bell Canada Papers on Economic and Public Policy.

Betcherman, G. and R. Morissette (1993) 'Recent Youth Labour Market Experiences in Canada', Paper Prepared for the Canadian Employment Research Forum workshop on Youth Labour Adjustment, Vancouver, June 25, 1993.

Binder, D.A. and M.S. Kovacevic (1993) 'Estimating Some Measures of Income Inequality from Survey Data : An Application of the Estimating Equation Approach', Methodology Branch, Statistics Canada, Mimeo.

Blackburn, M.E., Bloom, D.E. and R.B. Freeman (1990) 'The Declining Economic Position of Less Skilled American Men' in Gary Burtless ed. A Future of Lousy Jobs ?, Washington, DC : The Brookings Institution.

Blank and Hanratty (1991) 'Responding to Need : A Comparison of Social Safety Net in the United States and Canada' Paper Presented at NBER Conference on US and Canadian Labour Markets, National Bureau of Economic Research.

Bluestone, B. and B. Harrison (1982) The Deindustrialization of America, NY : Basic Books.

Bluestone, B. and B. Harrison (1986) 'The Great American Job Machine : The Proliferation of Low Wage Employment in the U.S. Economy', Study Prepared for the Joint Economic Committee.

Bound, J. and G. Johnson (1992) 'Changes in the Structure of Wages in the 1980s : An Evaluation of Alternative Explanations', American Economic Review 82 : 371-392.

Burtless, G. (1990) 'Earnings Inequality Over the Business and Demographic Cycles', in Gary Burtless ed. A Future of Lousy Jobs ?, Washington, DC : The Brookings Institution.

Danziger, S. and P. Gotschalk (1993), 'Uneven Tides : Rising Inequality in America', Russell Sage Foundation, New York.

Davis, S.J. (1992) 'Cross-Country Patterns of Change in Relative Wages', National Bureau of Economic Research Working Paper no. 4085.

Doiron, D.J. and G.F. Barrett (1992) 'Inequality in Male and Female Earnings : The Role of Hours and Wages', Center for Research on Economic and Social Policy, University of British Columbia, Discussion Paper no. 92-36.

Economic Council of Canada (1990) Good Jobs, Bad Jobs : Employment in the Service Economy. Ottawa: Supply and Services Canada.

Economic Council of Canada (1991) Employment in the Service Economy. Ottawa : Supply and Services Canada.

Foster, J.E. and M.C. Wolfson (1992) 'Polarization and the Decline of the Middle Class : Canada and the U.S', Vanderbilt University and Statistics Canada, mimeo.

Freeman, R.B. and K. Needels (1991) 'Skill Differentials in Canada in an Era of Rising Labor Market Inequality', National Bureau of Economic Research Working Paper no. 3827.

Gottschalk, P. and M. Joyce (1992) 'Is Earnings Inequality Also Rising in Other Industrialized Countries', Mimeo.

Gower, D. (1986) 'Characteristics of Persons With Long Workweeks', The Labour Force, Statistics Canada Catalogue 71-001, September.

Hanratty and Blank (1992) 'Down and Out in North America : Recent Trends in Poverty Rates in the United States and Canada', Quarterly Journal of Economics, February 1992.

Harrison, B. and B. Bluestone (1988) The Great U-Turn : Corporate Restructuring and the Polarizing of America. N.Y.: Basic Books.

Karoly, L.A. (1992) 'Changes in the Distribution of Individual Earnings in the United States : 1967-1986', Review of Economic and Statistics, February, 74(1) : 107-115.

Katz, L.F. and K.M. Murphy (1992) 'Changes in Relative Wages, 1963-1987 : Supply and Demand Factors', Quarterly Journal of Economics, 107(1) : 35-78.

Kuttner, R. (1983), 'The Declining Middle', The Atlantic Monthly, July.

Leckie, M., (1988), 'The Declining Middle and Technological Change : Trends in the Distribution of Employment Income, 1971-84', Economic Council of Canada Discussion Paper #342.

Levy, F. and R.J. Murnane (1992) 'U.S. Earnings Levels and Earnings Inequality : A Review of Recent Trends and Proposed Explanations', Journal of Economic Literature, Vol. XXX, September : 1333-1381.

Love, R. and S. Poulin (1991) 'Family Income Inequality in the 1980s' Perspectives on Labour and Income, Statistics Canada, Cat. 75-001E, Autumn 1991 : 51-57.

Macphail, F. (1993) 'Has the Great U-Turn Gone Full Circle ? : Recent Trends in Earnings Inequality in Canada 1981-89', Dalhousie University, Mimeo.

Mincer, J. (1991) 'Human Capital, Technology and the Wage Structure : What Do Time Series Show?', National Bureau of Economic Research Working Paper no. 3581.

Moffitt, R.A. (1990) 'The Distribution of Earnings and the Welfare State', in Gary Burtless ed. A Future of Lousy Jobs?, Washington, DC : The Brookings Institution.

Myles, J., Picot, G. and T. Wannell (1988) 'Wages and Jobs in the 1980s : Changing Youth Wages and the Declining Middle', Analytical Studies Branch Research Paper No. 17, Statistics Canada, Ottawa.

Organization for Economic Co-operation and Development (1993) 'Earnings Inequality : Changes in the 1980s', Employment Outlook.

Phillips, K. (1993) Boiling Point : Democrats, Republicans and the Decline of Middle-Class Prosperity, Random House, New York.

Picot, G., Myles, J. and T. Wannell (1990) 'Good Jobs/Bad Jobs and the Declining Middle : 1967-1986', Statistics Canada, Analytical Studies Branch Research Paper Series no. 28.

Reich, R.B. (1991) The Work of Nations : Preparing Ourselves For 21st Century Capitalism. Alfred A. Knopf, New York, 331 p.

Van Cleef, D. (1985) 'Persons Working Long Hours', The Labour Force, Statistics Canada Catalogue 1001, May.

Wolfson, M.C. (1986) 'Stasis Amid Change : Income Inequality in Canada, 1965-1983', Review of Income and Wealth, December, 32(4) : 337-369.

Wolfson, M.C. (1992) 'Inequality and Polarization : Is There a Disappearing Middle Class in Canada?' in Proceedings of the Statistics Canada Symposium on Analysis of Data in Time, October 1989, revised version, Statistics Canada, Ottawa, mimeo.

Table 1 : Percentage change in real annual earnings at the bottom, middle and top quintiles¹ : 1973, 1981 and 1989

Percentage change between 19__ and 19__ :	73	81	73
	81	89	89
I. All earners			
Men			
Bottom quintile	-8.6 %	-8.4 %	-16.3 %
Middle quintile	4.7 %	-3.1 %	1.4 %
Top quintile	3.4 %	4.3 %	7.9 %
Women			
Bottom quintile	17.4 %	16.1 %	36.2 %
Middle quintile	16.6 %	9.9 %	28.0 %
Top quintile	17.9 %	8.8 %	28.2 %
II. Full year full-time workers²			
Men			
Bottom quintile	1.6 %	-8.4 %	-7.0 %
Middle quintile	7.4 %	-0.1 %	7.2 %
Top quintile	3.6 %	5.5 %	9.3 %
Women			
Bottom quintile	0.2 %	-3.0 %	-2.9 %
Middle quintile	14.1 %	3.4 %	18.0 %
Top quintile	16.7 %	7.8 %	25.9 %

1. The figures presented in this table are the percentage change in **mean** annual earnings of individuals in a given quintile. These mean annual earnings are expressed in 1986 constant dollars, using the Consumer Price Index as the deflator.

2. Full year full-time workers are defined as individuals working at least 48 weeks and working mainly full-time during those weeks.

Source : Survey of Consumer Finances.

Table 2 : Percentage of full year full-time workers¹ in given earnings boundaries, 1973, 1981 and 1989.

	1973	1981	1989	1981 vs 1973	1989 vs 1981	1989 vs 1973	Net shift out of (-) middle class 1973 - 1989
Men							
Earnings boundaries (\$ 1989)							
1) <= \$ 17,662	10.4	10.9	13.4	0.5	2.5	3.0	
2) 17,662 - 22,429	9.4	9.3	9.9	-0.1	0.6	0.5	
3) 22,429 - 26,487	10.6	10.6	9.8	0.0	-0.8	-0.8	----
4) 26,487 - 29,531	9.5	8.9	6.8	-0.6	-2.1	-2.7	
5) 29,531 - 32,574	9.9	10.1	9.9	0.2	-0.2	0.0	
6) 32,574 - 35,989	10.4	9.1	8.5	-1.3	-0.6	-1.9	-5.6 %
7) 35,989 - 40,385	10.2	11.3	10.4	1.1	-0.9	0.2	
8) 40,385 - 45,424	9.8	9.7	9.4	-0.1	-0.3	-0.4	---
9) 45,424 - 54,249	10.0	10.1	10.6	0.1	0.5	0.6	
10) > \$ 54,249	9.9	9.9	11.2	0.0	1.3	1.3	
Total	100.0	100.0	100.0	-	-	-	
Women							
Earnings boundaries (\$ 1989)							
1) <= \$ 11,986	9.8	13.6	14.9	3.8	1.3	5.1	
2) 11,986 - 15,322	10.7	10.6	10.9	-0.1	0.3	0.2	
3) 15,322 - 17,176	8.5	7.8	6.2	-0.7	-1.6	-2.3	----
4) 17,176 - 19,438	12.3	10.1	8.4	-2.2	-1.7	-3.9	
5) 19,438 - 21,291	8.9	8.2	9.8	-0.7	1.6	0.9	
6) 21,291 - 23,479	9.8	10.2	8.0	0.4	-2.2	-1.8	-8.5 %
7) 23,479 - 26,444	10.1	9.4	10.5	-0.7	1.1	0.4	
8) 26,444 - 30,189	10.3	9.6	9.2	-0.7	-0.4	-1.1	
9) 30,189 - 36,084	9.8	9.2	9.1	-0.6	-0.1	-0.7	----
10) > \$ 36,084	9.9	11.3	13.0	1.4	1.7	3.1	
Total	100.0	100.0	100.0	-	-	-	

1. Full year full-time workers are defined as individuals working at least 48 weeks and working mainly full-time during those weeks.

Source : Survey of Consumer Finances.

Table 3 : Percentage of all earners in given earnings boundaries, 1973, 1981 and 1989.

	1973	1981	1989	1981 vs 1973	1989 vs 1981	1989 vs 1973	Net shift out of (-) middle class 1973 - 1989
Men							
Earnings boundaries (\$ 1989)							
1) <= \$ 6,560	10.0	11.4	12.2	1.4	0.8	2.2	
2) 6,560 - 13,014	9.9	10.4	11.9	0.5	1.5	2.0	
3) 13,014 - 18,822	10.4	10.0	9.8	-0.4	-0.2	-0.6	----
4) 18,822 - 23,017	9.6	9.0	8.6	-0.6	-0.4	-1.0	
5) 23,017 - 26,889	10.0	9.0	7.4	-1.0	-1.6	-2.6	-9.1 %
6) 26,889 - 30,761	10.4	9.8	8.8	-0.6	-1.0	-1.6	
7) 30,761 - 34,633	9.6	8.6	7.3	-1.0	-1.3	-2.3	
8) 34,633 - 39,828	10.2	10.3	9.2	0.1	-1.1	-1.0	----
9) 39,828 - 48,540	10.1	10.5	12.1	0.4	1.6	2.0	
10) > \$ 48,540	9.8	10.9	12.7	1.1	1.8	2.9	
Total	100.0	100.0	100.0	-	-	-	
Women							
Earnings boundaries (\$ 1989)							
1) <= \$ 2,546	9.8	9.5	9.1	-0.3	-0.4	-0.7	
2) 2,546 - 4,959	9.9	10.0	8.3	0.1	-1.7	-1.6	
3) 4,959 - 8,176	10.8	10.3	11.3	-0.5	1.0	0.5	
4) 8,176 - 11,795	9.8	10.4	10.2	0.6	-0.2	0.4	
5) 11,795 - 15,415	9.6	9.8	11.0	0.2	1.2	1.4	
6) 15,415 - 18,632	9.3	9.0	8.9	-0.3	-0.1	-0.4	
7) 18,632 - 22,252	10.8	10.4	11.5	-0.4	1.1	0.7	
8) 22,252 - 26,676	9.9	10.5	10.2	0.6	-0.3	0.3	
9) 26,676 - 33,512	10.0	9.7	9.2	-0.3	-0.5	-0.8	
10) > \$ 33,512	10.0	10.4	10.3	0.4	-0.1	0.3	
Total	100.0	100.0	100.0	-	-	-	

Source : Survey of Consumer Finances.

Table 4 : Decomposition of inequality in annual earnings by age and education, 1981-88.

Decomposition using : —	(1) Square of cv	(2) Theil Entropy index	(3) Theil Bernoulli index
I. All earners			
Men			
a) Inequality in 1981 :	0.452	0.209	0.281
b) Inequality in 1988 :	0.538	0.243	0.322
c) Change in inequality = b) - a) :	0.086	0.034	0.041
1) due to change in mean earnings between age/education groups	0.021	0.013	0.023
2) due to change in inequality within age/education groups	0.088	0.032	0.034
3) due to change in the composition of employment by age and education	-0.023	-0.011	-0.016
Women			
a) Inequality in 1981 :	0.559	0.277	0.378
b) Inequality in 1988 :	0.613	0.290	0.386
c) Change in inequality = b) - a) :	0.054	0.013	0.008
1) due to change in mean earnings between age/education groups	0.040	0.014	0.018
2) due to change in inequality within age/education groups	0.035	0.009	0.003
3) due to change in the composition of employment by age and education	-0.021	-0.010	-0.013
II. Full year full-time workers			
Men			
a) Inequality in 1981 :	0.272	0.113	0.125
b) Inequality in 1988 :	0.323	0.132	0.142
c) Change in inequality = b) - a) :	0.051	0.019	0.017
1) due to change in mean earnings between age/education groups	0.001	0.003	0.005
2) due to change in inequality within age/education groups	0.049	0.017	0.013
3) due to change in the composition of employment by age and education	0.001	-0.001	-0.001
Women			
a) Inequality in 1981 :	0.239	0.116	0.137
b) Inequality in 1988 :	0.293	0.136	0.155
c) Change in inequality = b) - a) :	0.054	0.020	0.018
1) due to change in mean earnings between age/education groups	0.013	0.005	0.005
2) due to change in inequality within age/education groups	0.035	0.013	0.013
3) due to change in the composition of employment by age and education	0.006	0.002	0.000

Table 5 : Percentage change¹ in real earnings between 1981 and 1988, by age and education.

	Men		Women	
	(1)	(2)	(3)	(4)
	Actual % change	% change keeping age and education composition fixed at 1981 level	Actual % change	% change keeping age and education composition fixed at 1981 level
I. All earners				
Age				
17-24	-18.1	-18.1	-10.7	-11.8
25-34	- 8.0	- 9.1	1.6	- 0.3
35-44	1.2	- 3.1	6.8	- 1.0
45-54	4.0	- 1.0	15.8	6.5
55-64	6.0	1.8	1.4	- 2.7
Education level				
None or elementary	0.1	- 0.4	- 6.3	- 7.4
9-13 years	- 1.6	- 6.2	2.4	- 2.4
Some post-secondary	- 3.6	- 8.5	- 4.3	- 7.3
Post-secondary cert./diploma	- 3.4	- 5.6	4.3	2.3
University degree	- 3.1	- 7.4	6.8	0.7
All	0.2	- 5.8	6.7	- 2.0
II. Full year full-time workers				
Age				
17-24	-12.0	-12.4	- 4.7	- 6.6
25-34	- 5.2	- 5.7	- 2.0	- 3.7
35-44	2.4	- 1.1	3.8	- 3.8
45-54	3.5	- 0.5	12.9	3.7
55-64	10.3	5.8	1.8	- 3.1
Education level				
None or elementary	2.3	2.5	- 6.4	- 6.8
9-13 years	0.1	- 2.3	0.2	- 2.5
Some post-secondary	0.6	- 3.4	- 2.5	- 4.9
Post-secondary cert./diploma	- 2.1	- 3.3	- 1.5	- 2.6
University degree	- 1.3	- 5.3	2.7	- 2.1
All	2.1	- 2.5	4.5	- 3.0

1. Columns 1 and 3 give the actual percentage changes in real annual earnings. Columns 2 and 4 show the percentage change in real annual earnings that would have been observed between 1981 and 1988 if the distribution of employment by age and education (defined by the age and education categories used in the table) had been in 1988 the same as in 1981.

Source : Survey of Consumer Finances.

Table 6 :

Inequality in annual earnings, annual hours and hourly wages for individuals holding the same full-time job all year, 1981, 1986 and 1989.

	Men				Women			
	(1) 1981	(2) 1986	(3) 1989	(4) [(3)-(1)]/(1)	(5) 1981	(6) 1986	(7) 1989	(8) [(7)-(5)]/(5)
I. Coefficient of variation								
Annual earnings	0.455	0.484	0.477	4.8 %	0.474	0.473	0.500	5.5 %
Annual hours	0.155	0.166	0.182	17.4 %	0.137	0.151	0.164	19.7 %
Hourly wages	0.455	0.472	0.454	- 0.2 %	0.472	0.451	0.476	0.8 %
II. Gini coefficient								
Annual earnings	0.237	0.241	0.241	1.7 %	0.238	0.247	0.253	6.3 %
Annual hours	0.055	0.061	0.071	29.1 %	0.053	0.060	0.063	18.9 %
Hourly wages	0.239	0.238	0.237	- 0.8 %	0.240	0.241	0.246	2.5 %
III. Theil-Entropy index								
Annual earnings	0.094	0.101	0.099	5.3 %	0.096	0.102	0.109	13.5 %
Annual hours	0.010	0.012	0.014	40.0 %	0.008	0.010	0.011	37.5 %
Hourly wages	0.095	0.097	0.094	- 1.1 %	0.098	0.095	0.101	3.1 %
IV. Theil-Bernouilli index								
Annual earnings	0.098	0.104	0.100	2.0 %	0.096	0.108	0.111	15.6 %
Annual hours	0.009	0.010	0.012	33.3 %	0.008	0.009	0.010	25.0 %
Hourly wages	0.100	0.101	0.097	- 3.0 %	0.099	0.102	0.105	6.1 %

Source : Survey of Work History (1981) and Labour Market Activity Survey (1986, 1989)

Table 7 : Distribution of weekly hours worked by individuals holding the same full-time job all year, 1981, 1986 and 1989.

	1981	1986	1989	1989 vs 1981
Men				
Hours per week				
1-19	0.0	0.0	0.0	0.0
20-34	1.4	1.5	2.0	0.6
35-40	82.1	79.3	73.7	-8.4
41-49	8.1	8.6	12.7	4.6
>= 50	8.4	10.6	11.6	3.2
Women				
Hours per week				
1-19	0.0	0.0	0.0	0.0
20-34	6.2	7.3	8.1	1.9
35-40	87.4	84.4	81.5	-5.9
41-49	3.6	4.2	6.6	3.0
>= 50	2.7	4.2	3.8	1.1

Source : Survey of Work History (1981) and Labour Market Activity Survey (1986, 1989).

Table 8 : Standardized Gini coefficients of annual earnings for individuals holding the same full-time job all year, 1981 and 1989.

	Men	Women
Gini coefficients :		
1) in 1981	0.237	0.238
2) in 1989	0.241	0.253
3) with hourly wages of 1981 and hours of 1989 ¹	0.248	0.255
4) with hourly wages of 1989 and hours of 1981 ¹	0.229	0.237

1. Gini coefficients in row 3 (4) are calculated by reducing the earnings distribution to 100 centiles and by calculating, for each centile, the hypothetical total earnings that would result from multiplying mean hourly wages of that centile in 1981 (1989) with total hours worked in that centile in 1989 (1981).

Source : Survey of Work History (1981) and Labour Market Activity Survey (1989).

Table 9 : Percentage change¹ in real hourly wages in full-time jobs, by age and education, 1981-88.

	Men		Women	
	(1) Actual % change	(2) % change keeping age and education composition fixed at 1981 level	(3) Actual % change	(4) % change keeping age and education composition fixed at 1981 level
Age				
17-24	-12.8	-13.8	- 9.6	-12.3
25-34	- 1.1	- 1.6	0.3	- 3.0
35-44	7.1	3.1	9.0	0.8
45-54	14.3	8.7	5.2	- 1.1
55-64	17.0	14.6	0.3	- 4.5
Education level				
None or elementary	2.9	2.2	- 2.3	- 3.2
9-13 years	1.0	- 1.4	- 3.0	- 6.2
Some post-secondary	5.5	4.0	- 0.9	- 4.2
Post-secondary cert./diploma	3.4	3.1	0.7	- 1.7
University degree	8.5	5.5	2.6	- 0.3
All	5.6	1.4	4.2	- 4.1

1. Columns 1 and 3 give the actual percentage changes in real hourly wages. Columns 2 and 4 show the percentage change in real hourly wages that would have been observed between 1981 and 1988 if the distribution of employment (as measured by the number of hours worked in a year) by age and education (defined by the age and education categories used in the table) had been in 1988 the same as in 1981.

Source : Survey of Work History (1981) and Labour Market Activity Survey (1988).

Table 10 : Decomposition of inequality in hourly wages by age, individuals holding the same full-time job all year, 1981-89.

Decomposition using :	(1) Square of cv	(2) Theil Entropy index	(3) Theil Bernouilli index
Men			
a) Inequality in 1981 :	0.207	0.095	0.100
b) Inequality in 1989 :	0.206	0.094	0.097
c) Change in inequality = b) - a) :	-0.001	-0.001	-0.003
1) due to change in mean earnings between age groups	0.024	0.010	0.010
2) due to change in inequality within age groups	-0.015	-0.007	-0.009
3) due to change in the composition of employment by age	-0.010	-0.004	-0.004
Women			
a) Inequality in 1981 :	0.223	0.098	0.099
b) Inequality in 1989 :	0.226	0.101	0.105
c) Change in inequality = b) - a) :	0.003	0.003	0.006
1) due to change in mean earnings between age groups	0.011	0.005	0.005
2) due to change in inequality within age groups	-0.003	0.000	0.004
3) due to change in the composition of employment by age	-0.005	-0.002	-0.003

Source : Survey of Work History (1981) and Labour Market Activity Survey (1989)

Table 11 : Change in the distribution of weekly hours worked¹, 1981-89.

	Men	Women
Hours per week		
1-19	0.7	-1.3
20-34	0.9	1.8
35-40	-4.4	-3.1
41-49	0.4	1.0
>= 50	2.3	1.7

1. The numbers presented in this table are changes in the percentage of individuals in given hours boundaries. They refer to usual hours worked in all jobs by paid workers.

Source : Labour Force Survey.

Table 12 : Distribution of weekly hours worked by all earners, 1981, 1986 and 1989.

	1981	1986	1989	1989 vs 1981
Men				
Hours per week				
1-19	1.3	1.6	1.8	0.5
20-34	2.5	3.2	3.5	1.0
35-40	73.8	69.0	62.9	-10.9
41-49	8.8	9.5	13.1	4.3
>= 50	13.7	16.8	18.7	5.0
Women				
Hours per week				
1-19	4.6	5.3	5.4	0.8
20-34	11.6	13.5	14.2	2.6
35-40	74.4	69.5	67.0	-7.4
41-49	4.3	5.1	7.1	2.8
>= 50	5.1	6.6	6.3	1.2

Source : Survey of Work History (1981) and Labour Market Activity Survey (1986, 1989).

Table 13 : Standardized Gini coefficients of annual earnings for all earners, 1981 and 1989.

	Men	Women
Gini coefficients :		
1) in 1981	0.346	0.412
2) in 1989	0.359	0.400
3) with hourly wages of 1981 and hours of 1989 ¹	0.357	0.400
4) with hourly wages of 1989 and hours of 1981 ¹	0.347	0.412

1. Gini coefficients in row 3 (4) are calculated by reducing the earnings distribution to 100 centiles and by calculating, for each centile, the hypothetical total earnings that would result from multiplying mean hourly wages of that centile in 1981 (1989) with total hours worked in that centile in 1989 (1981).

Source : Survey of Work History (1981) and Labour Market Activity Survey (1989).

Appendix A : Inequality measures¹, 1969-1991.

Men

All earners					Full year full-time workers				
Year	CV	TE	GINI	TB	Year	CV	TE	GINI	TB
1969	0.684	0.204	0.336	0.260	1969	0.556	0.118	0.252	0.113
1971	0.724	0.213	0.340	0.269	1971	0.602	0.130	0.260	0.131
1973	0.682	0.204	0.339	0.259	1973	0.543	0.118	0.254	0.121
1975	0.701	0.212	0.344	0.270	1975	0.556	0.121	0.255	0.123
1977	0.630	0.199	0.338	0.274	1977	0.480	0.106	0.246	0.122
1979	0.622	0.196	0.336	0.272	1979	0.477	0.107	0.248	0.123
1981	0.673	0.209	0.346	0.281	1981	0.522	0.113	0.252	0.125
1983	0.767	0.262	0.387	0.355	1983	0.577	0.132	0.270	0.143
1986	0.731	0.248	0.377	0.336	1986	0.559	0.133	0.274	0.150
1988	0.734	0.243	0.373	0.322	1988	0.568	0.132	0.273	0.142
1989	0.736	0.239	0.371	0.314	1989	0.581	0.136	0.277	0.146
1990	0.733	0.249	0.381	0.332	1990	0.564	0.138	0.281	0.153
1991	0.818	0.271	0.393	0.353	1991	0.639	0.146	0.282	0.147

Women

All earners					Full year full-time workers				
Year	CV	TE	GINI	TB	Year	CV	TE	GINI	TB
1969	0.766	0.288	0.414	0.397	1969	0.450	0.096	0.236	0.108
1971	0.792	0.281	0.404	0.381	1971	0.541	0.115	0.250	0.125
1973	0.751	0.277	0.407	0.378	1973	0.461	0.101	0.243	0.114
1975	0.734	0.268	0.398	0.371	1975	0.446	0.093	0.230	0.106
1977	0.756	0.281	0.409	0.385	1977	0.486	0.117	0.260	0.149
1979	0.742	0.274	0.405	0.378	1979	0.469	0.107	0.251	0.126
1981	0.747	0.277	0.408	0.378	1981	0.489	0.116	0.263	0.137
1983	0.837	0.316	0.433	0.425	1983	0.565	0.136	0.279	0.155
1986	0.777	0.288	0.416	0.386	1986	0.535	0.135	0.283	0.156
1988	0.783	0.290	0.417	0.386	1988	0.541	0.136	0.285	0.155
1989	0.742	0.269	0.401	0.363	1989	0.525	0.131	0.280	0.151
1990	0.774	0.282	0.410	0.371	1990	0.526	0.128	0.275	0.145
1991	0.760	0.281	0.411	0.377	1991	0.506	0.121	0.270	0.135

1. CV = coefficient of variation, TE = Theil-Entropy index, GINI = Gini coefficient, TB = Theil-Bernouilli index.
Source : Survey of Consumer Finances.

Appendix B : Polarization measures, 1969-1991.

Men

	All earners				Full year full-time workers				
	P75	P50	P25	FWP		P75	P50	P25	FWP
1969	36.5	61.7	78.6	0.260	1969	47.6	79.2	90.6	0.188
1971	35.9	62.0	79.4	0.260	1971	48.3	77.8	89.8	0.188
1973	34.4	60.6	78.6	0.272	1973	47.4	77.1	89.9	0.192
1975	34.7	60.0	78.1	0.272	1975	47.8	77.5	89.9	0.192
1977	33.9	58.1	77.5	0.276	1977	46.4	77.3	90.0	0.192
1979	33.0	58.4	77.4	0.280	1979	46.1	77.0	90.3	0.196
1981	31.8	56.6	76.1	0.292	1981	45.3	75.1	89.6	0.200
1983	26.9	50.5	70.4	0.344	1983	44.3	72.5	88.3	0.212
1986	25.6	49.7	71.7	0.340	1986	42.0	72.5	89.2	0.216
1988	27.9	52.1	72.7	0.328	1988	40.9	71.9	89.1	0.220
1989	27.5	52.3	73.4	0.324	1989	41.1	71.3	88.3	0.220
1990	26.8	51.1	70.6	0.336	1990	40.3	71.1	87.1	0.224
1991	25.4	48.4	68.5	0.356	1991	40.9	71.0	87.8	0.228

Women

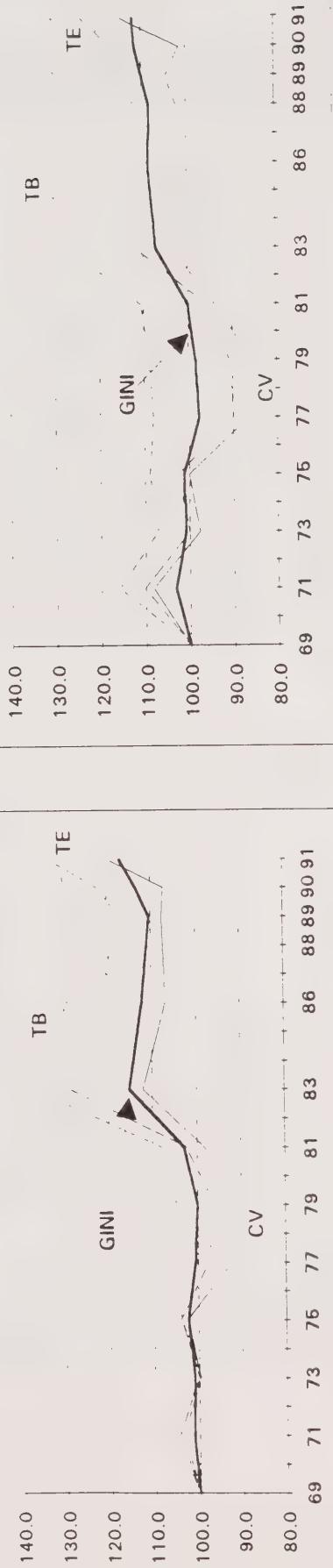
	All earners				Full year full-time workers				
	P75	P50	P25	FWP		P75	P50	P25	FWP
1969	19.3	41.7	64.6	0.408	1969	50.2	77.6	91.0	0.184
1971	22.8	45.8	67.0	0.376	1971	47.5	76.4	88.4	0.192
1973	21.3	43.2	65.5	0.396	1973	47.2	76.2	89.2	0.196
1975	23.1	44.8	66.9	0.380	1975	51.4	78.6	90.0	0.184
1977	21.3	42.8	65.5	0.396	1977	47.2	73.1	85.6	0.200
1979	21.3	43.9	66.2	0.392	1979	46.4	73.7	88.2	0.204
1981	20.9	43.1	65.3	0.400	1981	42.7	72.2	87.1	0.212
1983	19.0	37.5	58.0	0.460	1983	40.7	69.1	86.6	0.228
1986	20.4	40.0	63.1	0.424	1986	39.4	68.9	86.5	0.228
1988	20.6	43.0	64.8	0.408	1988	40.5	67.7	84.8	0.232
1989	21.9	45.4	67.1	0.388	1989	41.5	68.4	85.2	0.228
1990	20.9	42.7	65.4	0.408	1990	40.5	70.3	87.7	0.228
1991	20.9	42.7	65.4	0.420	1991	41.2	70.4	87.3	0.224

1. P75 = percentage of individuals earning between 75 % and 125 % of median earnings,
 P50 = percentage of individuals earning between 50 % and 150 % of median earnings,
 P25 = percentage of individuals earning between 25 % and 175 % of median earnings,
 FWP = Foster-Wolson polarization measure = $2 * [2 * (0.50 - \text{Share50}) - \text{Gini}] * (\text{Mean}/\text{Median})$, where
 Share50 = share of earnings of the bottom half of the distribution and other variables are self-explanatory.

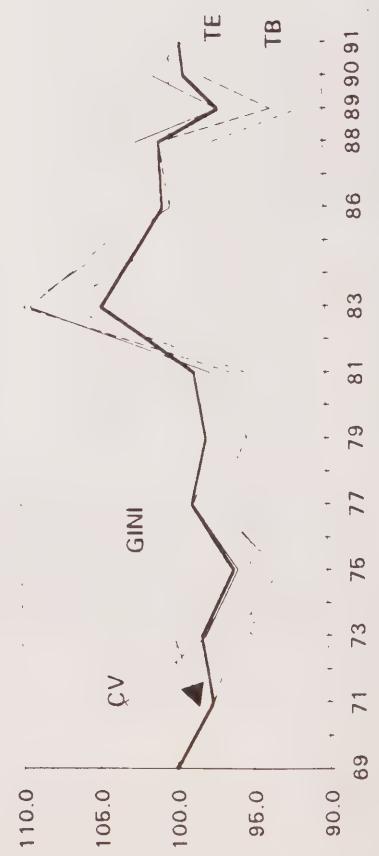
Source : Survey of Consumer Finances.

Figure 1: Standardized Inequality Indexes : 1969 - 1991 (1969 : 100)

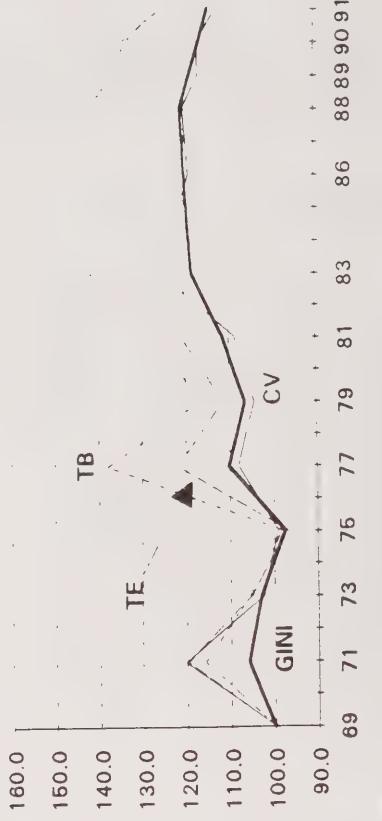
Men : All Earners



Women : All Earners



Men : Full Year Full-Time



Women : Full Year Full-Time

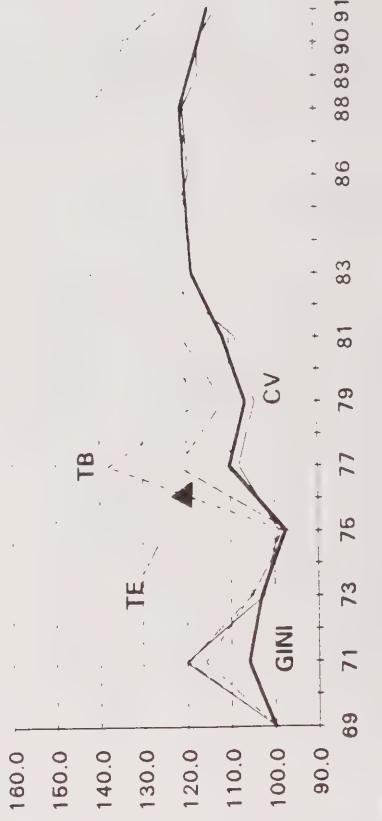
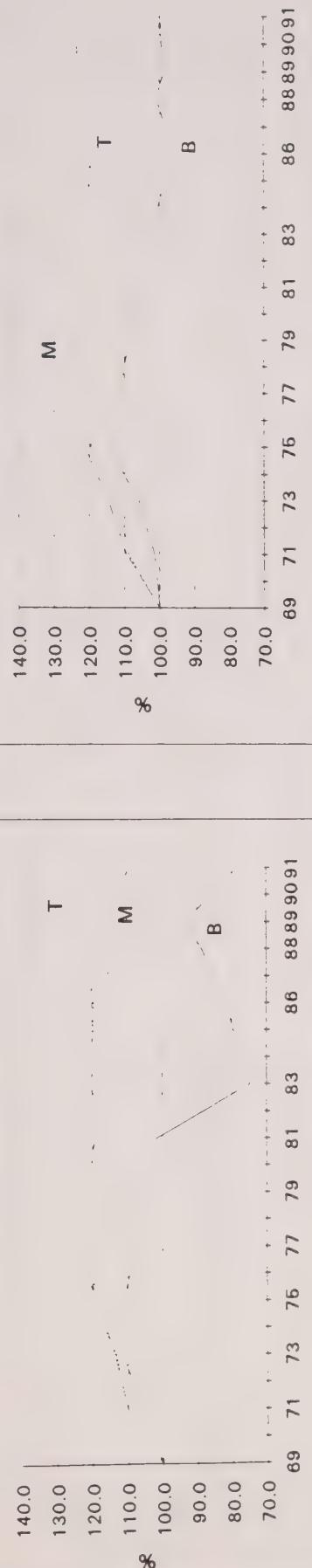
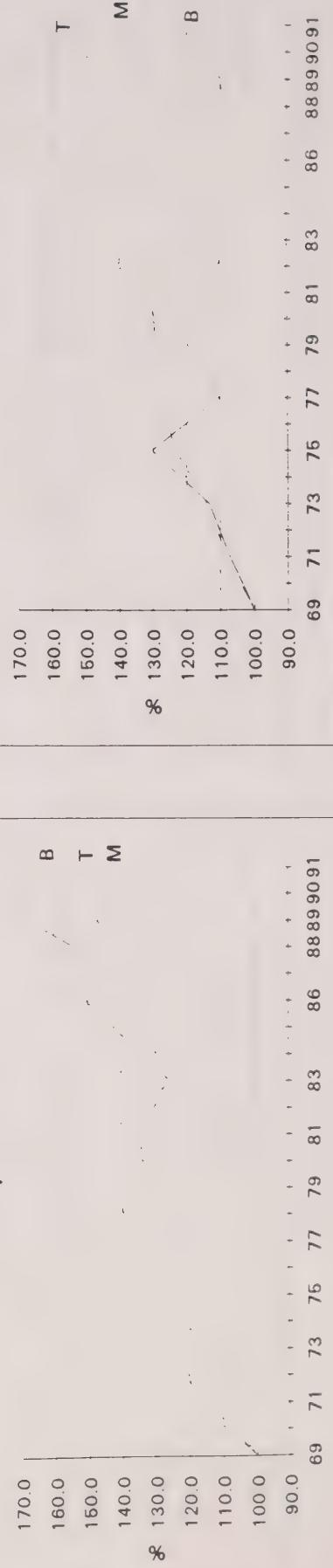


Figure 2: Real Annual Earnings at the Bottom, Middle and Top Quintiles (1969 : 100), 1969-1991

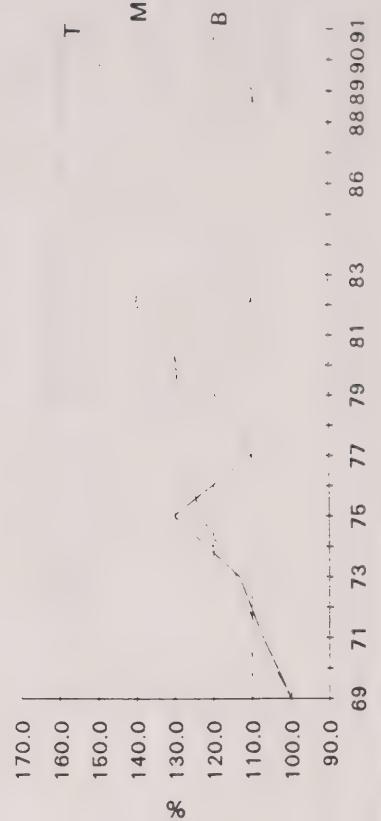
Men: All Earners



Women: All Earners



Men: Full Year Full-Time



Women: Full Year Full-Time

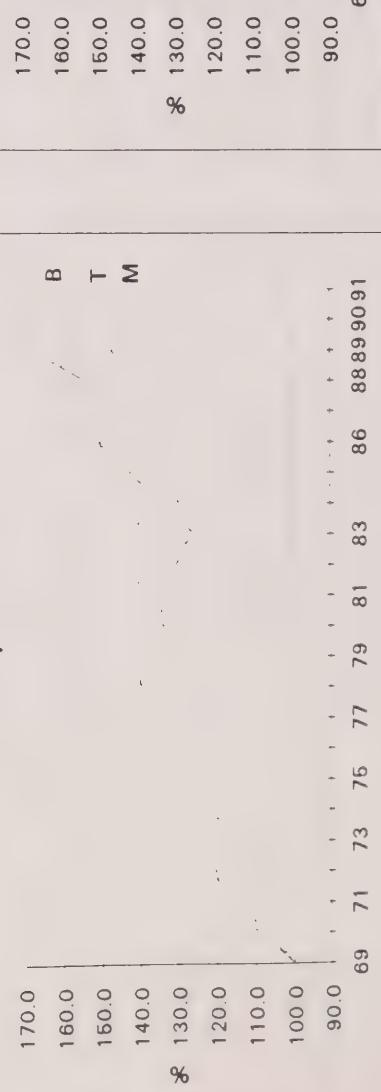


Figure 3: Proportion of Individuals in the Middle of the Earnings Distribution, 1969-1991

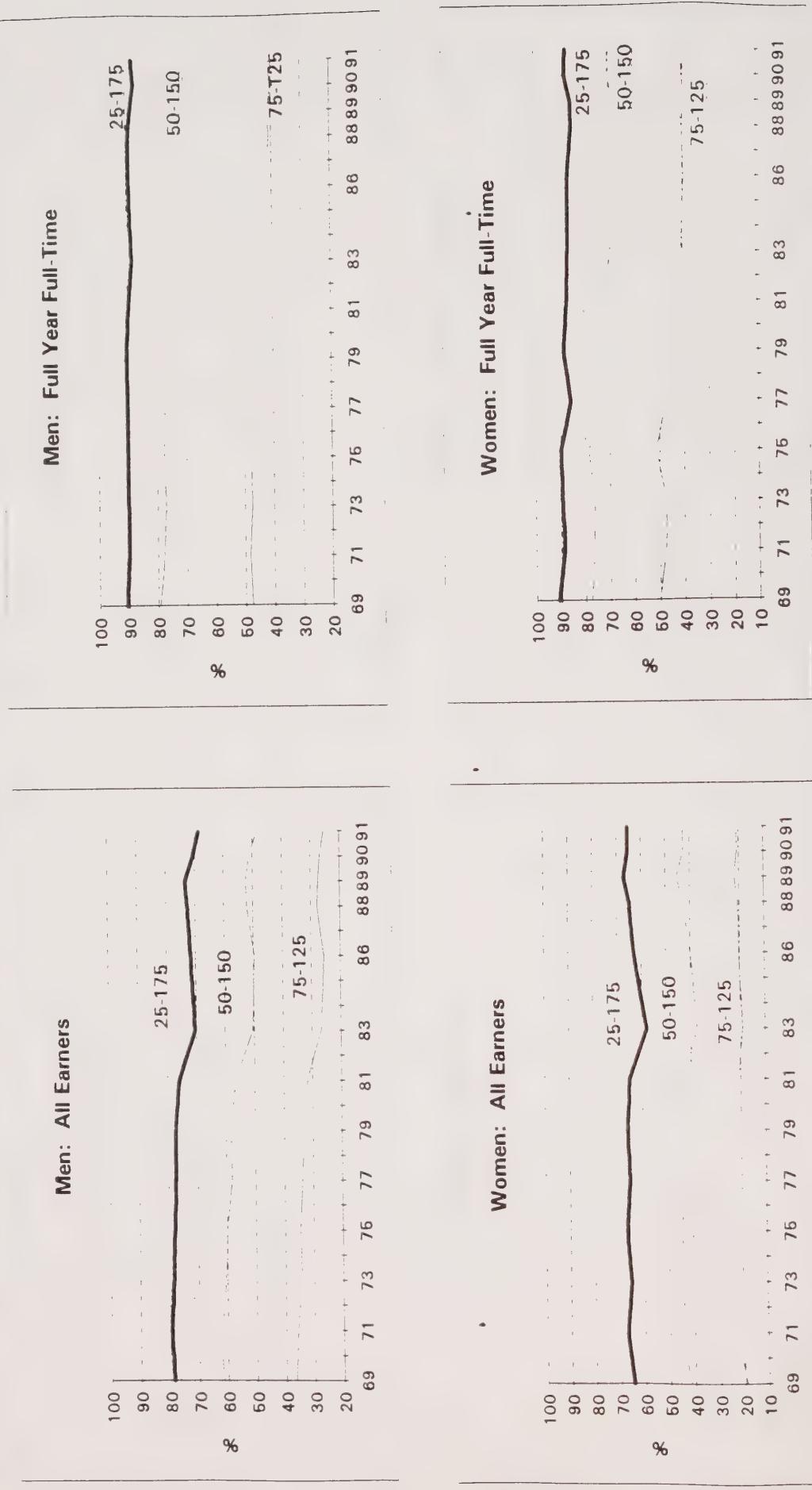
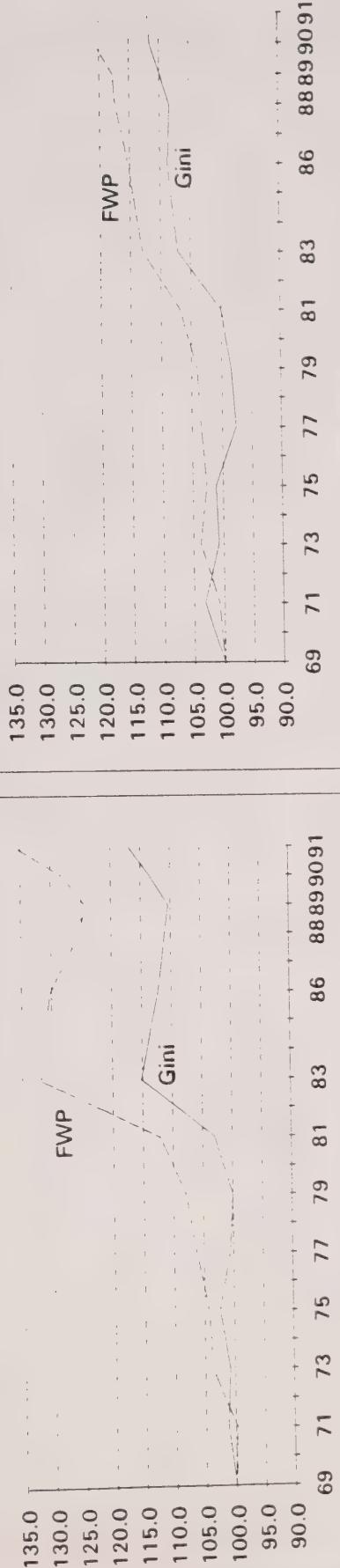
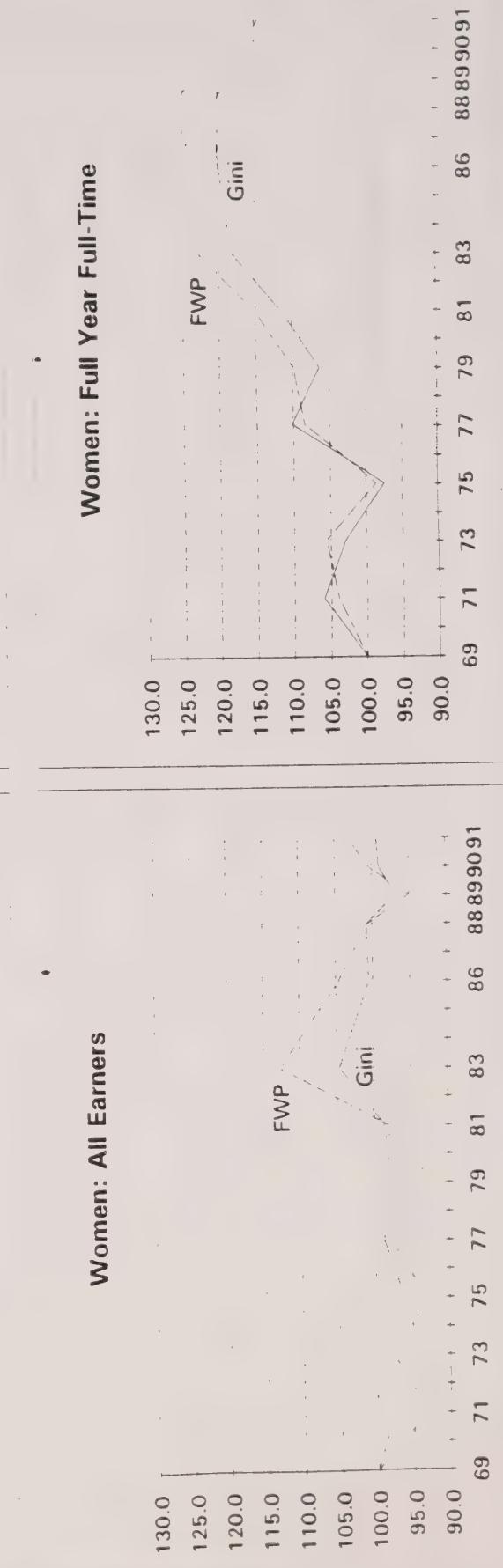


Figure 4: Gini Coefficient (Gini) and Foster - Wolfson Polarization (FWP) Measure, 1969 - 1991 (1969 = 100)

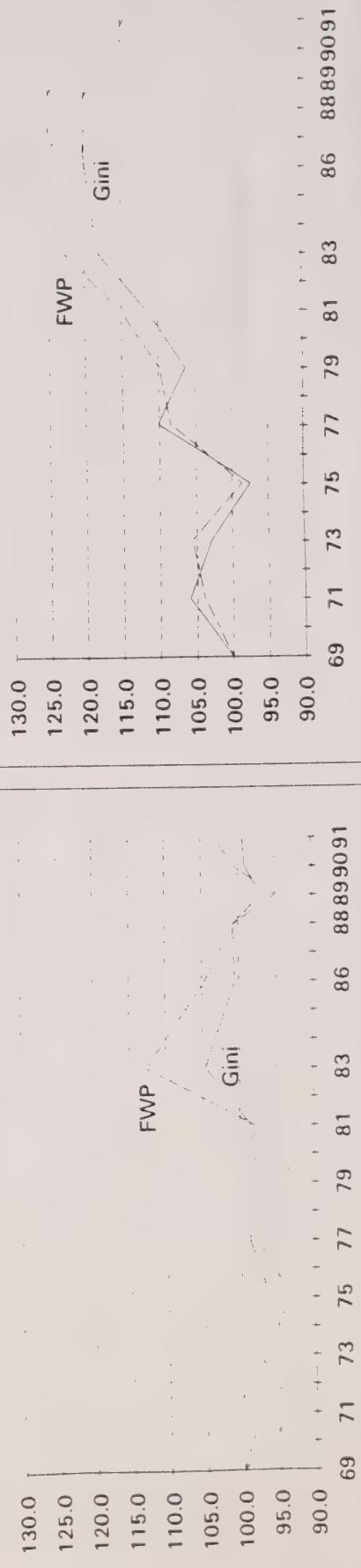
Men: All Earners



Men: full Year Full-Time



Women: All Earners



Women: Full Year Full-Time

Figure 5: Real Annual Earnings by Age Group, 1969-1991 (1969 : 100)

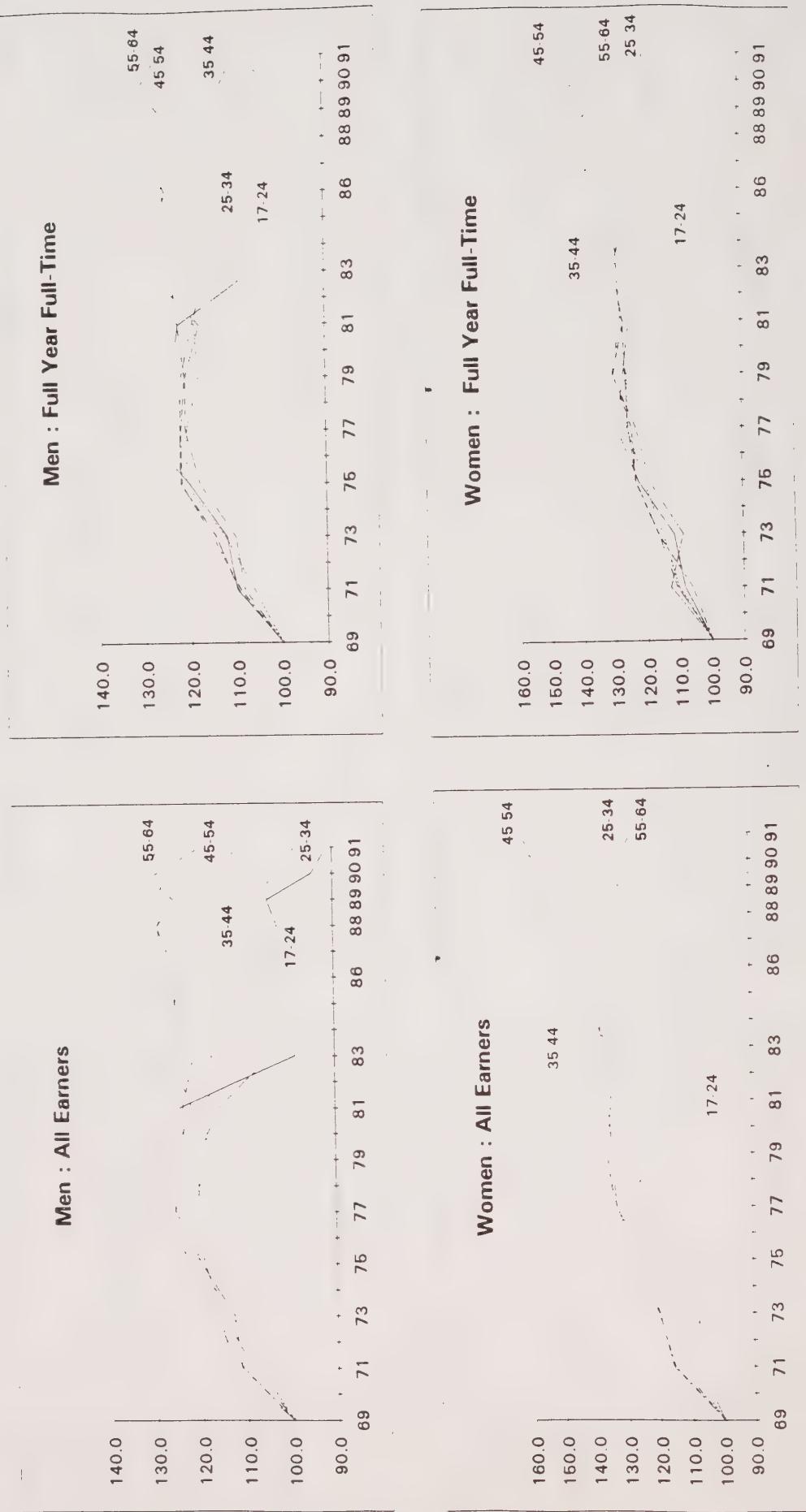
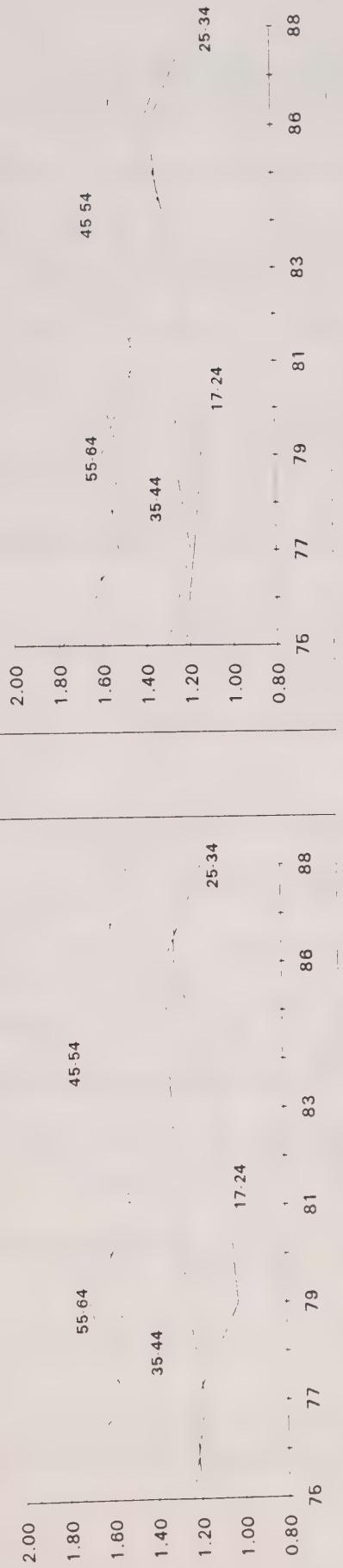
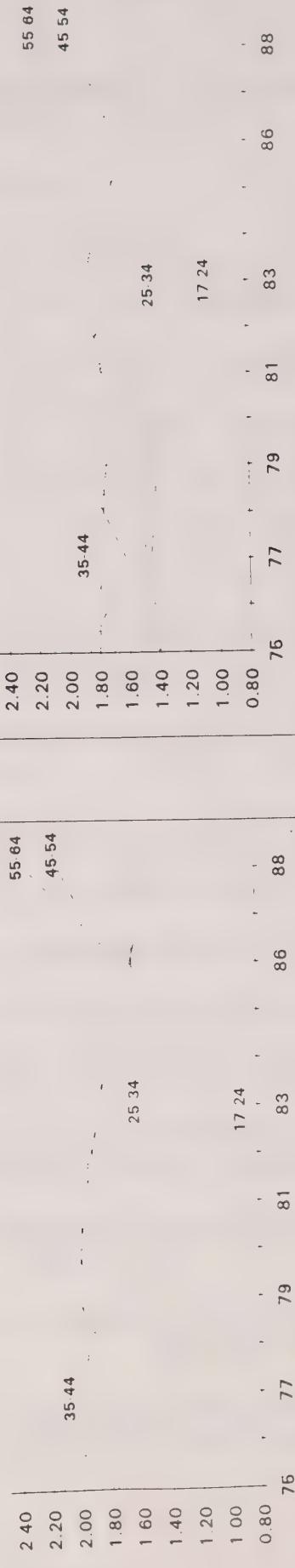


Figure 6: University/High School Earnings Ratio, By Age, 1975-1988

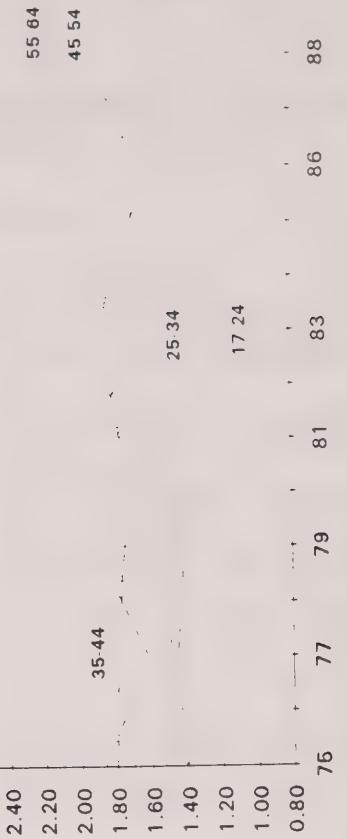
Men : All Earners



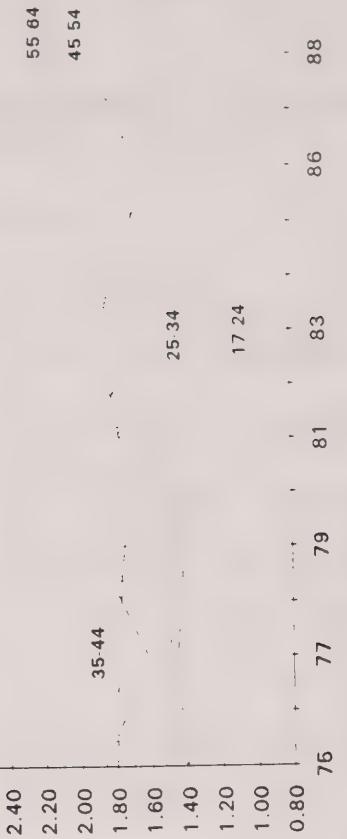
Women : All Earners



Men : Full Year Full-Time



Women : Full Year Full-Time



**ANALYTICAL STUDIES BRANCH
RESEARCH PAPER SERIES**

No.

1. *Behavioural Response in the Context of Socio-Economic Microanalytic Simulation, Lars Osberg*
2. *Unemployment and Training, Garnett Picot*
3. *Homemaker Pensions and Lifetime Redistribution, Michael Wolfson*
4. *Modelling the Lifetime Employment Patterns of Canadians, Garnett Picot*
5. *Job Loss and Labour Market Adjustment in the Canadian Economy, Garnett Picot and Ted Wannell*
6. *A System of Health Statistics: Toward a New Conceptual Framework for Integrating Health Data, Michael C. Wolfson*
7. *A Prototype Micro-Macro Link for the Canadian Household Sector, Hans J. Adler and Michael C. Wolfson*
8. *Notes on Corporate Concentration and Canada's Income Tax, Michael C. Wolfson*
9. *The Expanding Middle: Some Canadian Evidence on the Deskilling Debate, John Myles*
10. *The Rise of the Conglomerate Economy, Jorge Niosi*
11. *Energy Analysis of Canadian External Trade: 1971 and 1976, K.E. Hamilton*
12. *Net and Gross Rates of Land Concentration, Ray D. Bollman and Philip Ehrensaft*
13. *Cause-Deleted Life Tables for Canada (1972 to 1981): An Approach Towards Analyzing Epidemiologic Transition, Dhruva Nagnur and Michael Nagrodski*
14. *The Distribution of the Frequency of Occurrence of Nucleotide Subsequences, Based on Their Overlap Capability, Jane F. Gentleman and Ronald C. Mullin*
15. *Immigration and the Ethnolinguistic Character of Canada and Quebec, Réjean Lachapelle*
16. *Integration of Canadian Farm and Off-Farm Markets and the Off-Farm Work of Women, Men and Children, Ray D. Bollman and Pamela Smith*

17. *Wages and Jobs in the 1980s: Changing Youth Wages and the Declining Middle*,
J. Myles, G. Picot and T. Wannell
18. *A Profile of Farmers with Computers*, *Ray D. Bollman*
19. *Mortality Risk Distributions: A Life Table Analysis*, *Geoff Rowe*
20. *Industrial Classification in the Canadian Census of Manufactures: Automated Verification Using Product Data*, *John S. Crysdale*
21. *Consumption, Income and Retirement*, *A.L. Robb and J.B. Burbridge*
22. *Job Turnover in Canada's Manufacturing Sector*, *John R. Baldwin and Paul K. Gorecki*
23. *Series on The Dynamics of the Competitive Process*, *John R. Baldwin and Paul K. Gorecki*
 - A. *Firm Entry and Exit Within the Canadian Manufacturing Sector.*
 - B. *Intra-Industry Mobility in the Canadian Manufacturing Sector.*
 - C. *Measuring Entry and Exit in Canadian Manufacturing: Methodology.*
 - D. *The Contribution of the Competitive Process to Productivity Growth: The Role of Firm and Plant Turnover.*
 - E. *Mergers and the Competitive Process.*
 - F. *(in preparation)*
 - G. *Concentration Statistics as Predictors of the Intensity of Competition.*
 - H. *The Relationship Between Mobility and Concentration for the Canadian Manufacturing Sector.*
24. *Mainframe SAS Enhancements in Support of Exploratory Data Analysis*, *Richard Johnson and Jane F. Gentleman*
25. *Dimensions of Labour Market Change in Canada: Intersectoral Shifts, Job and Worker Turnover*, *John R. Baldwin and Paul K. Gorecki*
26. *The Persistent Gap: Exploring the Earnings Differential Between Recent Male and Female Postsecondary Graduates*, *Ted Wannell*
27. *Estimating Agricultural Soil Erosion Losses From Census of Agriculture Crop Coverage Data*, *Douglas F. Trant*
28. *Good Jobs/Bad Jobs and the Declining Middle: 1967-1986*, *Garnett Picot, John Myles, Ted Wannell*
29. *Longitudinal Career Data for Selected Cohorts of Men and Women in the Public Service, 1978-1987*, *Garnett Picot and Ted Wannell*

30. *Earnings and Death - Effects Over a Quarter Century*, **Michael Wolfson, Geoff Rowe, Jane F. Gentleman and Monica Tomiak**
31. *Firm Response to Price Uncertainty: Tripartite Stabilization and the Western Canadian Cattle Industry*, **Theodore M. Horbulyk**
32. *Smoothing Procedures for Simulated Longitudinal Microdata*, **Jane F. Gentleman, Dale Robertson and Monica Tomiak**
33. *Patterns of Canadian Foreign Direct Investment Abroad*, **Paul K. Gorecki**
34. *POHEM - A New Approach to the Estimation of Health Status Adjusted Life Expectancy*, **Michael C. Wolfson**
35. *Canadian Jobs and Firm Size: Do Smaller Firms Pay Less?*, **René Morissette**
36. *Distinguishing Characteristics of Foreign High Technology Acquisitions in Canada's Manufacturing Sector*, **John R. Baldwin and Paul K. Gorecki**
37. *Industry Efficiency and Plant Turnover in the Canadian Manufacturing Sector*, **John R. Baldwin**
38. *When the Baby Boom Grows Old: Impacts on Canada's Public Sector*, **Brian B. Murphy and Michael C. Wolfson**
39. *Trends in the distribution of Employment by Employer Size: Recent Canadian Evidence*, **Ted Wannell**
40. *Small Communities in Atlantic Canada: Their Industrial Structure and Labour Market conditions in the Early 1980s*, **Garnett Picot and John Heath**
41. *The Distribution of Federal/Provincial Taxes and Transfers in rural Canada*, **Brian B. Murphy**
42. *Foreign Multinational Enterprises and Merger Activity in Canada*, **John Baldwin and Richard Caves**
43. *Repeat Users of the Unemployment Insurance Program*, **Miles Corak**
44. *POHEM -- A Framework for Understanding and Modelling the Health of Human Population*, **Michael C. Wolfson**
45. *A Review of Models of Population Health Expectancy: A Micro-Simulation Perspective*, **Michael C. Wolfson and Kenneth G. Manton**

46. *Career Earnings and Death: A Longitudinal Analysis of Older Canadian Men*, **Michael C. Wolfson, Geoff Rowe, Jane Gentleman and Monica Tomicak**
47. *Longitudinal Patterns in the Duration of Unemployment Insurance Claims in Canada*, **Miles Corak**
48. *The Dynamics of Firm Turnover and the Competitive Process*, **John Baldwin**
49. *Development of Longitudinal Panel Data from Business Registers: Canadian Experience*, **John Baldwin, Richard Dupuy and William Penner**
50. *The Calculation of Health-Adjusted Life Expectancy for a Multi-Attribute Utility Function: A First Attempt*, **J.-M. Berthelot, R. Roberge and M.C. Wolfson**
51. *Testing The Robustness of Entry Barriers*, **J. R. Baldwin, M. Rafiquzzaman**
52. *Canada's Multinationals: Their Characteristics and Determinants*, **Paul K. Gorecki**
53. *The Persistence of unemployment: How Important were Regional Extended Unemployment Insurance Benefits?* **Miles Corak, Stephen Jones**
54. *Cyclical Variation in the Duration of Unemployment Spells*, **Miles Corak**
55. *Permanent Layoffs and Displaced Workers: Cyclical Sensitivity, Concentration, and Experience Following the Layoff*, **Garnett Picot, Wendy Pyper**
56. *The Duration of Unemployment During Boom and Bust**, **Miles Corak**
57. *Getting a New Job in 1989-90 in Canada*, **René Morissette**
58. *Linking survey and administrative data to study determinants of health*, **P. David, J.-M. Berthelot and C. Mustard**
59. *Extending Historical Comparability in Industrial Classification*, **John S. Crysdale**
60. *What is Happening to Earnings Inequality in Canada?*, **R. Morissette, J. Myles and G. Picot**

For further information, contact the Chairperson, Publications Review Committee, Analytical Studies Branch, R.H. Coats Bldg., 24th Floor, Statistics Canada, Tunney's Pasture, Ottawa, Ontario, K1A 0T6, (613) 951-8213.

